EOSDIS Core System Project

Interface Control Document Between EOSDIS Core System (ECS) and Science Computing Facilities (SCF)

January 1996

Interface Control Document
between
EOSDIS Core System (ECS)
and
Science Computing Facilities (SCF)

Reviewed by:

Stan Scott Science Software Manager GSFC - Code 505	Date
Candace Carlisle Interface Manager GSFC - Code 505	Date
Melvin Banks Chief, ESDIS Development GSFC - Code 505	Date

Approved by:

Dale Harris Associate Director for ESDIS GSFC - Code 505	Date

GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

This page intentionally left blank.

Preface

This document is a formal contract deliverable with an approval code 1. It requires Government review and approval prior to acceptance and use. This document is under ECS contractor configuration control. Once this document is approved, Contractor approved changes are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

This document contains information pertaining to both Release A and Release B. For Release A content, this document is final. Release B content will be updated for the ECS Release B CDR to provide any additional format and content necessary.

Any questions should be addressed to:

ESDIS Project Configuration Management Office
NASA GSFC Code 505
Greenbelt, Md. 20771

This page intentionally left blank.

Abstract

This Release A and Release B Interface Control Document (ICD) defines the functional and physical design of each SCF-unique interface between ECS and the SCFs, and includes the precise data contents and format for each interface. SCF-unique interfaces are those applicable to SCFs but not applicable to general users. All modes (options) of data exchange for each interface are described as well as the conditions required for each mode or option and the typical data rates. The sequence of exchanges are completely described. Communications protocols are detailed for each interface.

This ICD is derived from the ECS-SCF interface requirements, as described in the Earth Science Data and Information System (ESDIS) Project -- Level 2 Requirements, the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Level 3 requirements, and the Interface Requirements Document Between EOSDIS Core System (ECS) and Science Computing Facilities.

This document contains information pertaining to both Release A and Release B. For Release A content, this document is final. Release B content will be updated for the ECS Release B CDR to provide any additional format and content necessary.

Keywords: SCF, ICD, LIS, CERES, Interface, Software, EOS, Science, Scientist, Computing MISR, MODIS, MOPITT, ASTER, SAGE III, ACRIM, SeaWinds, ALT RADAR

This page intentially left blank.

This page is intentially left blank.

This page intentionally left blank.

Contents

Preface

Abstract

1. Introduction

1.1 Identification 1-1

1.2 Scope 1-1

1.3 Purpose and Objectives 1-2

1.4 Status and Schedule 1-3

1.5 Organization 1-3

2. Related Documentation

2.1 Parent Documents 2-1

2.2 Applicable Documents 2-1

2.3 Information Documents 2-1

3. Interface Overview

3.1 Introduction 3-1

3.2 Interface Implementation 3-1

4. Data Exchange Framework

4.1 Operations Concept for Internal Interfaces, Subscriptions, and Data Retrieval 4-1

4.2 Network Topology 4-2

4.3 Internetworking Protocols 4-3

4.4 Kerberized File Transfers 4-3

4.5 Distributed Computing Environment 4-3

4.6 ECS Ingest Requirements 4-4
4.7 ECS Data Availability Notice 4-5
4.8 Error Conditions 4-5

5. Data Flows

5.1 ECS Software Package External Interfaces 5-1
5.1.1 ECS Software Package Subscription Acknowledgment 5-1
5.1.2 ECS Software Package Announcement 5-2
5.1.3 ECS Software Package 5-2
5.2 Integration and Test Requirements External Interfaces 5-3
5.2.1 Data Availability Notice for Integration and Test Requirements 5-3
5.2.2 Integration and Test Requirements 5-3
5.3 Interactive Session Dialog External Interfaces 5-4
5.3.1 Interactive Session Dialog 5-4
5.3.2 Science Software Integration and Test Status 5-5
5.4 Data Production Software Delivery Package External Interfaces 5-5
5.4.1 Data Production Software Delivery Package via Network 5-5
5.4.2 Data Production Software Delivery Package via Media 5-5
5.5 Operational Data Production Software Package External Interfaces 5-7
5.5.1 Data Availability Notice for Operational Data Production Software Package 5-7
5.5.2 Operational Science Data Production Software Package 5-7
5.6 Results of Testing Interfaces 5-7
5.6.1 Test Product Availability Message during Software Integration and Test 5-7
5.6.2 Data Availability Notice for Test Products after Software Integration and Test 5-8
5.6.3 Test Products 5-9
5.6.4 Test Product Reviews 5-9
5.7 QA External Interfaces 5-10
5.7.1 QA Notification Specification 5-10
5.7.2 QA Notification Specification Acknowledgment 5-10
5.7.3 Data Quality Request Notification 5-11

5.7.4 Data Availability Notice for Data Delivered for QA 5-12
5.7.5 Data Delivered for QA 5-13
5.8 Processing Status External Interfaces 5-13
5.8.1 Data Availability Notice for Processing Status 5-13
5.8.2 Processing Status 5-13
5.9 Resource Usage External Interfaces 5-14
5.9.1 Data Availability Notice for Resource Usage 5-14
5.9.2 Resource Usage 5-14
5.10 Product History External Interfaces 5-15
5.10.1 Data Availability Notice for Product History 5-15
5.10.2 Product History 5-15
5.11 Reprocessing Request External Interfaces 5-16
5.11.1 Reprocessing Request 5-16
5.11.2 Reprocessing Request Acknowledgment 5-16
5.12 Coefficients and SCF-Generated Ancillary Data External Interfaces 5-17
5.12.1 Data Availability Notice for Coefficients and SCF-Generated Ancillary Data 5-17
5.12.2 Coefficients and SCF-Generated Ancillary Data 5-17
5.12.3 Coefficients and SCF-Generated Ancillary Data Update Package Network Ingest 5-18
5.12.4 Coefficients and SCF-Generated Ancillary Data Update Package Media Ingest 5-18
5.13 Special Products External Interfaces 5-19
5.13.1 Special Products via Network 5-20
5.13.2 Special Products via Media 5-20
5.13.3 Ancillary Data via Network 5-20
5.13.4 Ancillary Data via Media 5-21
5.13.5 Calibration Data via Network 5-21
5.13.6 Calibration Data via Media 5-22
5.13.7 Correlative Data via Network 5-22
5.13.8 Correlative Data via Media 5-23
5.13.9 Documents via Network 5-23
5.13.10 Documents via Media 5-24
5.13.11 Science Data Production Software via Network 5-24

5.13.12 Science Data Production Software via Media……5-25

Figures

3.1-1. External SCF Interfaces ……3-2

4.1-1. Operations Concept for Subscriptions and Data Retrieval……4-1

4.2-1. DAAC-SCF Network Connectivity Diagram ……4-2

Tables

4.6-1. Delivery Record PVL Parameters and Values ……4-6

4.6-2. Required Metadata for Data Production Software Delivery Package……4-7

4.6-3. Required Metadata for Coefficients and SCF-Generated Ancillary Data Update Package……4-8

4.7-1. DAN PVL Parameters and Values ……4-9

4.7-2. Sample Data Availability Notice for Two Files ……4-10

5.1.1-1. Description of ECS Software Package Subscription Acknowledgment……5-1

5.1.2-1. Description of ECS Software Package Announcement……5-2

5.1.3-1. Description of ECS Software Package……5-3

5.2.1-1. Description of Data Availability Notice for Integration and Test Requirements….5-3

5.2.2-1. Description of Integration and Test (I&T) Requirements ……5-4

5.3.1-1. Description of Interactive Session Dialog……5-4

5.3.2-1. Description of Science Software Integration and Test Status……5-5

5.4.1-1. Description of Data Production Software Delivery Package via Network……5-6

5.4.2-1. Description of Data Production Software Delivery Package via Media……5-6

5.5.1-1. Description of Data Availability Notice for Operational Data Production Software Package ……5-7

5.5.2-1. Description of the Operational Science Data Production Software Package ……5-8

5.6.1-1. Description of Test Product Availability Messages During Software Integration and Test ……5-8

5.6.2-1. Description of Data Availability Notice for Test Products After Software Integration and Test……5-9

5.6.3-1. Description of the Test Products 5-9
5.6.4-1. Description of Test Product Reviews 5-10
5.7.1-1. Description of QA Notification Specification 5-10
5.7.2-1. Description of QA Notification Specification Acknowledgment 5-11
5.7.2-2. Required Information in QA Notification Specification Acknowledgment 5-11
5.7.3-1. Description of Data Quality Request Notification 5-12
5.7.3-2. PVL Statements and Values for Data Quality Request Notification 5-12
5.7.4-1. Description of Data Availability Notice for Data Delivered for QA 5-12
5.7.5-1. Description of Data Delivered for QA 5-13
5.8.1-1. Description of Data Availability Notice for Processing Status 5-13
5.8.2-1. Description of Processing Status 5-14
5.9.1-1. Description of Data Availability Notice for Resource Usage 5-14
5.9.2-1. Description of Resource Usage 5-15
5.10.1-1. Description of Data Availability Notice for Product History 5-15
5.10.2-1. Description of Product History 5-16
5.11.1-1. Reprocessing Request 5-16
5.11.2-1. Reprocessing Request Acknowledgment 5-17
5.12.1-1. Description of Data Availability Notice for Coefficients and SCF-Generated Ancillary Data 5-17
5.12.2-1. Description of Coefficients and SCF-Generated Ancillary Data 5-18
5.12.3-1. Description of Coefficients and SCF-Generated Ancillary Data Update Package Network Ingest 5-19
5.12.4-1. Description of Coefficients and SCF-Generated Ancillary Data Update Package Media Ingest 5-19
5.13.1-1. Description of Special Products via Network 5-20
5.13.2-1. Description of Special Products via Media 5-20
5.13.3-1. Description of Ancillary Data via Network 5-21
5.13.4-1. Description of Ancillary Data via Media 5-21
5.13.5-1. Description of Calibration Data via Network 5-22
5.13.6-1. Description of Calibration Data via Media 5-22

5.13.7-1. Description of Correlative Data via Network 5-23
5.13.8-1. Description of Correlative Data via Media 5-23
5.13.9-1. Description of Documents via Network..... 5-24
5.13.10-1. Description of Documents via Media 5-24
5.13.11-1. Description of Science Data Production Software via Network..... 5-25

Appendix A. Internal and External Interfaces Between ECS and SCFs

Appendix B. SCF ICD Issues Related to Release B

Abbreviations and Acronyms

1. Introduction

1.1 Identification

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

1.2 Scope

This ICD defines the detailed design of the external interfaces between ECS and the Science Computing Facilities (SCF) that are unique to ECS-SCF interaction. ECS-SCF interfaces satisfy the requirements specified in the Interface Requirements Document Between EOSDIS Core System (ECS) and Science Computing Facilities. The general user interfaces not covered herein support those capabilities that SCFs share with all other ECS users, such as the conduct of data searches. Interfaces are included herein if they are necessary for the SCF to carry out its role as software developer and provider and for quality assurance of the associated data products.

These SCF interfaces support science data production software development by the scientists at SCFs and support data processing and data reprocessing operations at the Distributed Active Archive Centers (DAACs) using SCF-developed science data production software. This ICD specifies "DAAC" for data flows between an SCF and DAAC operations staff and specifies "ECS" for all other data flows. The SCF interfaces include the transfer of science data production software including coefficients and SCF-generated ancillary data, science data product quality assurance information, and information about science data processing and reprocessing. The interfaces also support software maintenance changes.

The ECS-SCF IRD identifies all of the interfaces that are unique to the ECS-SCF interaction. Many of these flows are to be implemented between ECS software at the DAACs and ECS supplied software resident at the SCF. From a design perspective these interfaces are internal to ECS because they are between two ECS software items (e.g., client-server interaction where the client is provided by ECS). This ICD describes the details of those remaining external ECS-SCF interfaces that are between ECS or DAAC operations on one side and SCF staff or software that is provided by the SCF on the other side. Throughout this document the term "external interfaces" refers to these latter SCF interfaces.

The instrument planning, scheduling, commanding, and telemetry monitoring interfaces between ECS and the SCFs are not covered in this ICD. Concerning the Instrument Support Toolkit (IST), The IST Capabilities Document for the ECS Project explains the capabilities of the IST and defines the interface between the IST and the SCF workstation hosting the toolkit. The definition of the interface between the IST and the EOSDIS Operations Center (EOC) are in ECS (FOS) internal requirements and design documents (because the EOC/IST interface is internal to FOS).

All SCF interfaces usually involve humans at the SCFs interacting with ECS. The SCFs can implement some interfaces by using ECS-provided software, can implement other interfaces by using public domain software, and can implement all remaining interfaces by using commercial off-the-shelf software rather than by coding new software to implement these interfaces. SCFs can optionally automate some interfaces by parsing notice email messages from ECS. Because these interfaces are intended to support interactions with humans, this ICD allows flexibility in the implementation of these interfaces.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the approval and maintenance of this ICD**.** Any changes in the interface definition must be assessed at the ESDIS Project Level. This ICD is approved under the signature of the ESDIS Project Manager.

ECS Releases are keyed to mission support: Release Ir1 provides support to TRMM Early Interface Testing and Science Software Integration and Test. Release A provides support to TRMM Science Operations and TRMM Ground Systems Certification Testing. Release A also provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and Science Operations, provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions, and supports the SeaWinds mission. Release B also provides archive and distribution services for the Landsat 7 mission.

Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.

This ICD provides the Release A and Release B implementations of the SCF-ECS interfaces. All interfaces in the ICD apply to both Release A and Release B unless the text explicitly states that an interface applies only to Release B. The documentation in this ICD as it relates to Release A is final. Release B content will be updated for the ECS Release B CDR to provide any additional format and content necessary.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction No. 11 dated December 6, 1994.

1.3 Purpose and Objectives

This ICD defines the unique external interfaces between the ECS and SCFs as derived from the Level 3 requirements specified in the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System and the Interface Requirements Document between EOSDIS Core System (ECS) and Science Computing Facilities. This document is written to formalize the interpretation of the external interface between ECS and the SCFs to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system. This ICD also provides a control point for the definition of external interfaces between ECS and the SCFs.

1.4 Status and Schedule

This ICD is submitted to NASA as a Configuration Control Board (CCB) approval code 1 document. At the Government's option, this document may be placed under full Government CCB control. Changes may be submitted at any time for consideration by Contractor and Government CCBs as part of the normal change process. This document is final with respect to its Release A content. Release B content will be updated for the ECS Release B CDR to provide any additional format and content necessary.

1.5 Organization

Section 1 introduces this document by providing its scope, purpose and objectives, ICD status and schedule, and document organization.

Section 2 lists the parent documents to which the interfaces in this ICD trace, the referenced documents that are directly applicable to this document, and information documents that may amplify or clarify information contained herein.

Section 3 provides an overview of the interfaces between ECS and the SCFs by summarizing the general functions of the interfaces, providing a diagram of the data flows, and describing the six types of external interfaces that cover all external interfaces in this ICD.

Section 4 contains a description of the data exchange framework that applies to the detailed interface definitions in Section 5. Section 4 describes a brief operations concept, network topology, inter-networking protocols, Kerberized file transfers, the Distributed Computing Environment, ECS ingest requirements, the ECS Data Availability Notice, and Error Conditions.

Section 5 provides detailed definitions of each data flow including source, destination, interface method, contents, formats, expected volumes, and expected frequencies.

The Abbreviations and Acronyms in Appendix AB define all abbreviations and acronyms that appear herein.

Appendix A provides a tabular summary of the internal and external interfaces between ECS and the SCFs. Readers who are unfamiliar with this ICD are advised to read this appendix first, rather than last, because it provides a top-level view of all SCF interfaces.

Appendix B contains salient Release B issues that are related to this document.

This page intentionally left blank.

2. Related Documentation

2.1 Parent Documents

The following documents are the parents from which this document's scope and content derive:

304-CD-002-002	Science Data Processing Segment (SDPS) Requirements Specification for the ECS Project
304-CD-003-002	Communications and System Management Segment (CSMS) Requirements Specification for the ECS Project
304-CD-005-001	Release B SDPS/CSMS System Requirements Specification for the ECS Project
423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the EOSDIS Core System (ECS)
505-41-12	Goddard Space Flight Center, Interface Requirements Document between EOSDIS Core System (ECS) and Science Computing Facilities

2.2 Applicable Documents

The following documents are referenced herein and are directly applicable to this document. In the event of conflict between any of these documents and this document, this document shall take precedence.

205-CD-002-002	Science User's Guide and Operations Procedure Handbook for the ECS Project, Part 4: Software Developers Guide to Preparation, Delivery, Integration and Test with ECS.

2.3 Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document, but are not binding.

209-CD-001-001	Interface Control Document Between EOSDIS Core System (ECS) and the NASA Science Internet (NSI)
209-CD-008-002	EOSDIS Core System Project Interface Control Document Between EOSDIS Core System (ECS) and the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC)

209-CD-009-002	EOSDIS Core System Project Interface Control Document Between EOSDIS Core System (ECS) and the Marshall Space Flight Center (MSFC) Distributed Active Archive Center (DAAC)
209-CD-010-001	Interface Control Document Between the EOSDIS Core System (ECS) and the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for the ECS Project
209-CD-021-001	Interface Control Document Between EOSDIS Core System (ECS) and the Alaska SAR Facility (ASF) Distributed Active Archive Center (DAAC)
209-CD-022-001	Interface Control Document Between EOSDIS Core System (ECS) and the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC)
194-219-SE1-001	Interface Requirements Document Between EOSDIS Core System (ECS) and the NASA Science Internet (NSI)
305-CD-002-002	Science Data Processing Segment (SDPS) Design Specification for the ECS Project
305-CD-003-002	Communications and System Management Segment (CSMS) Design Specification for the ECS Project
305-CD-005-001	Release A SDPS Client Subsystem Design Specification for the ECS Project
305-CD-009-001	Release A SDPS Ingest Subsystem Design Specification for the ECS Project
305-CD-020-001	Release B SDPS/CSMS Design Specification Overview for the ECS Project
305-CD-021-001	Release B SDPS Client Subsystem Design Specification for the ECS Project
305-CD-025-001	Release B SDPS Ingest Subsystem Design Specification for the ECS Project
313-CD-004-001	Release-A SDPS/CSMS Internal Interface Control Document for the ECS Project
313-CD-006-001	Release-B SDPS/CSMS Internal Interface Control Document
333-CD-003-002	SDP Toolkit User Guide for the ECS Project
194-815-SI4-001	SDP Toolkit Primer for the ECS Project
343-TP-001-001	IST Capabilities Document for the ECS Project
609-CD-001-001	Interim Release One (Ir1) Maintenance and Operations Procedures

CCSDS 641.0-B-l	Consultative Committee for Space Data Systems (CCSDS), Recommendation for Space Data System Standards: PVLSPEC - Parameter Value Language Specification, 5/92
ISO 7498	International Organization for Standardization, Basic Reference Model for Systems Interconnection
RFC 791	Postel, J.; Internet Protocol
RFC 793	Postel, J.; Transmission Control Protocol
RFC 821	Postel, J.; Simple Mail Transfer Protocol
RFC 822	Crocker, David H., Standard for the Format of ARPANET Text Messages
RFC 1510	Newman, C.; The Kerberos Network Authentication Service (V5)
none	HyperText Markup Language Specification Version 3.0, Internet Draft, D. Raggett
none	HyperText Transfer Protocol Version 1.0, Internet Draft. T. Berners-Lee, R. Fielding, H. Frystyk
none	X Window System Protocol, X Version 11, Release 5, Robert W. Scheifler, Massachusetts Institute of Technology

This page intentionally left blank.

3. Interface Overview

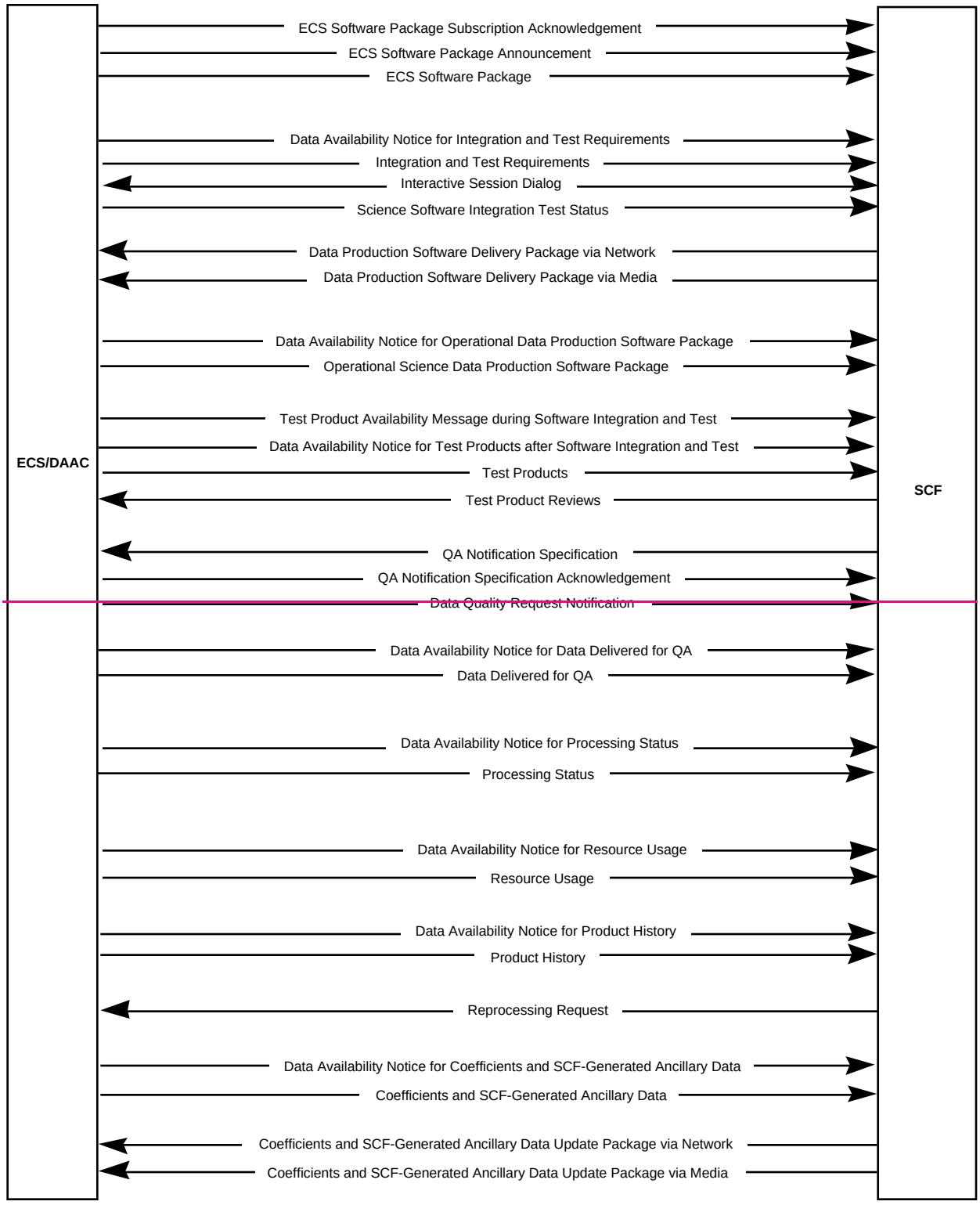
This section provides an overview of the SCF interfaces with ECS and a DAAC by summarizing the general functions of the interfaces, providing a diagram of the data flows, and describing the five general implementations used to support all external interfaces.

3.1 Introduction

The SCF interfaces support science data production software development by the scientists at SCFs and support data processing and data reprocessing operations at the Distributed Active Archive Centers (DAACs) using SCF-developed science data production software. The SCF interfaces include the transfer of science data production software including coefficients and SCF-generated ancillary data, science data product quality assurance information, and information about science data processing and reprocessing. Figure 3.1-1 shows the external SCF interfaces that support development of data production software and support DAAC use of the SCF-developed software for processing and reprocessing of science data. Note that Figure 3.1-1 does not include interfaces between the ECS Release A Client or the ECS Ingest GUI (Graphical User Interface) residing on an SCF workstation and the DAAC servers. These interfaces, although specified in the ECS-SCF IRD, are considered ECS internal interfaces. Appendix A provides a table of all IRD defined interfaces and an indication of internal or external implementation. Throughout this document, external SCF interfaces refer to the data flows shown in Figure 3.1-1.

3.2 Interface Implementation

Table 3.2-1 lists the types of implementation used to support the external SCF interfaces and the software that the SCFs are required to host for each interface implementation type. All Release A and Release B external interfaces with the SCFs are instances of a general interface type in this table. The interfaces normally involve human interaction and are not automated on the SCF side. Email messages from the SCFs to ECS and a DAAC are interactive while the email messages from ECS to the SCFs are machine generated. The manually-typed email messages from either an SCF or a DAAC are allowed to be in free form although necessary information must be included. The email messages do not include file attachments. This ICD specifies the types of information that manually-typed email messages must contain. ECS and DAAC operations personnel and SCFs will define further details about each email message as required. Table 3.2-1 provides a top-level view of the interface types that are elaborated in subsequent sections.


ECS/DAAC
SCF
ECS Software Package Subscription Acknowledgement
ECS Software Package Announcement
ECS Software Package
Data Availability Notice for Integration and Test Requirements
Integration and Test Requirements
Interactive Session Dialog
Science Software Integration Test Status
Data Production Software Delivery Package via Network
Data Production Software Delivery Package via Media
Data Availability Notice for Operational Data Production Software Package
Operational Science Data Production Software Package
Test Product Availability Message during Software Integration and Test
Data Availability Notice for Test Products after Software Integration and Test
Test Products
Test Product Reviews
QA Notification Specification
QA Notification Specification Acknowledgement
Data Quality Request Notification
Data Availability Notice for Data Delivered for QA
Data Delivered for QA
Data Availability Notice for Processing Status
Processing Status
Data Availability Notice for Resource Usage
Resource Usage
Data Availability Notice for Product History
Product History
Reprocessing Request
Data Availability Notice for Coefficients and SCF-Generated Ancillary Data
Coefficients and SCF-Generated Ancillary Data
Coefficients and SCF-Generated Ancillary Data Update Package via Network
Coefficients and SCF-Generated Ancillary Data Update Package via Media

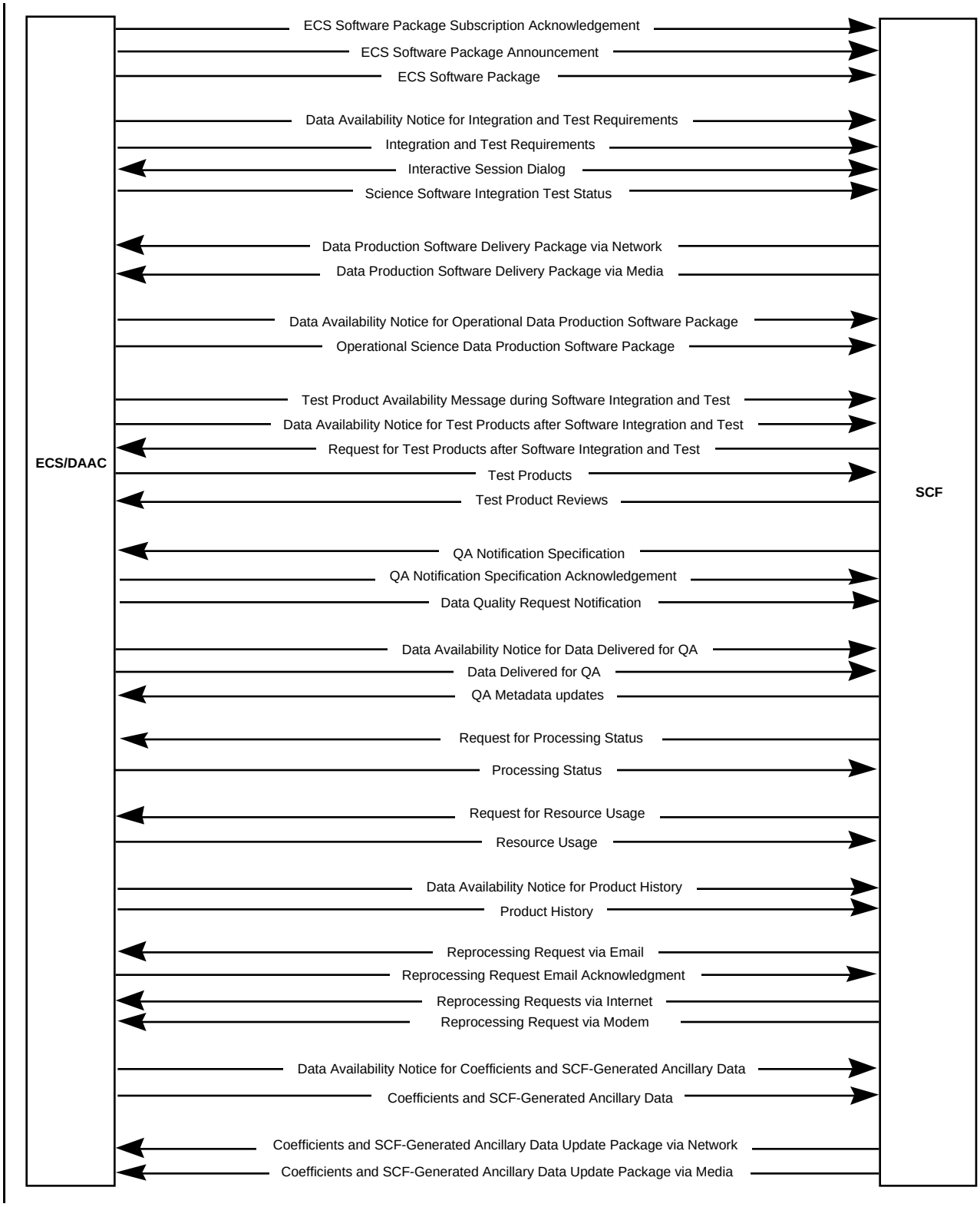


Figure 3.1-1. External SCF Interfaces (1 of 2)

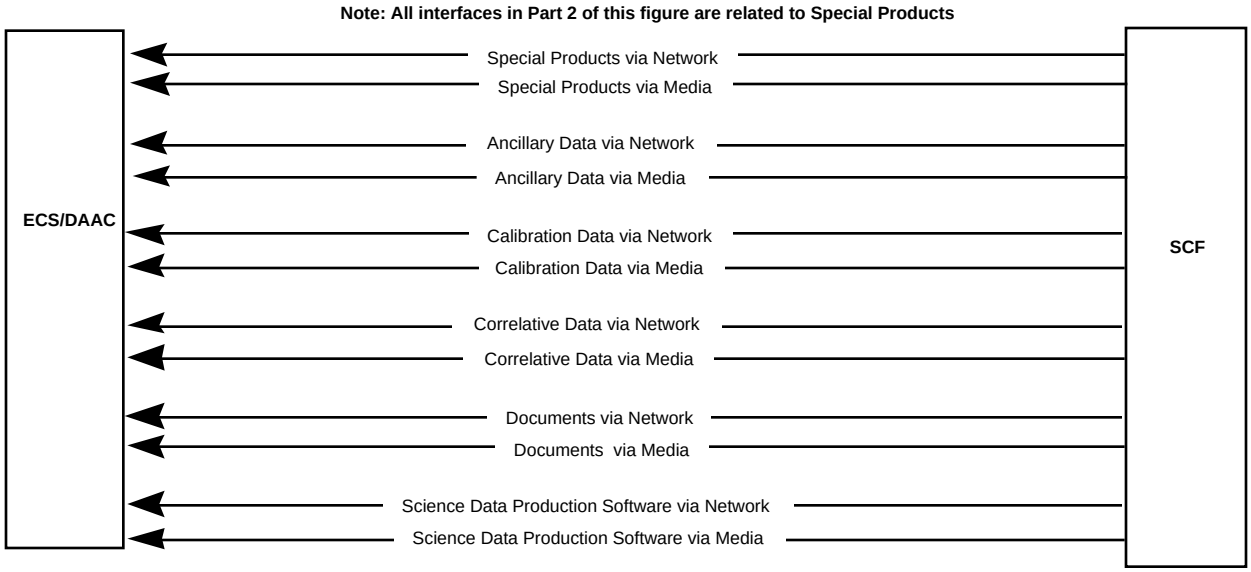


Figure 3.1-1. External SCF Interfaces (2 of 2)

Table 3.2-1. Software Requirements for Each Type of External ECS-SCF Interface

Interface Implementation Type	Required SCF Software
email	Workstation mail application
file transfer protocol (ftp)	Workstation Operating System and ftp software
Kerberized ftp (kftp)	Kerberos 5.5 (or later) client and Kerberos network utilities. Commercial support for Kerberos is recommended but not required.
Media Ingest	None (media delivery options include hand delivery and conventional mail)
World Wide Web (WWW)	WWW Browser with forms capability (Netscape 2.0 is recommended) or ECS-provided desktop tool for Web interfaces
X11 Access to DAAC	Kerberos network utilities and X server with Motif version 1.2.* in both Release A and Release B, where * represents a positive integer. Also 28.8 kbps V.34 modem and associated software if Internet connection with DAAC is not used.

This page intentionally left blank.

4. Data Exchange Framework

Section 4 contains a description of the data exchange framework and the methods used for the external SCF interfaces. This section provides the general foundation upon which Section 5 detailed interface definitions are built. The section describes the Operations Concept for Subscriptions and Data Retrieval, network topology, Inter-Networking Protocols, Kerberized file transfers, the Distributed Computing Environment, ECS ingest requirements, ECS Data Availability Notice, and Error Conditions.

4.1 Operations Concept for Internal Interfaces, Subscriptions, and Data Retrieval

This section summarizes the internal interfaces and explains the operations concept that underlies SCFs' subscriptions, data requests, and data transfers to the SCF. The internal interfaces consist of the use of ECS-developed and ECS-provided clients that reside on an SCF machine (the Release A Client, the Release B Client, and the ECS Ingest GUI). The ECS Ingest GUI is used by the SCF to request network ingest. The ECS Release A and Release B Clients are used to order data. The ECS Release B Client is used to enter subscriptions and receive acknowledgments of successful entry of those subscriptions. (Email is used to enter subscriptions in Release A.)

Figure 4.1-1 shows three data flows that are related to subscriptions and three data flows for data order and delivery. This operations concept for flows between the SCFs and ECS or a DAAC applies to Releases A and B.

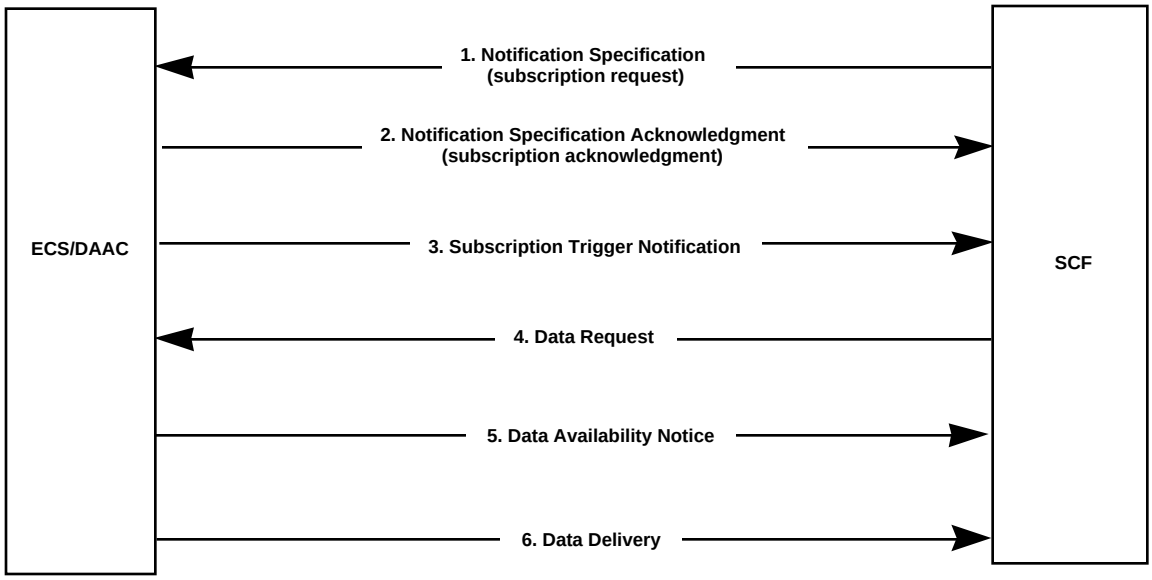


Figure 4.1-1. Operations Concept for Subscriptions and Data Retrieval

In Flow 1 the SCFs enter a subscription by specifying the events that trigger notifications. For example, the event that specified new data have been archived or the event that specified metadata parameters have changed could trigger a notification that the SCF should consider conducting Quality Assurance (QA) of science data. Flow 2 is an acknowledgment by ECS that the SCF successfully entered its subscription via Flow 1. After receiving a QA- related Subscription Trigger Notification (Flow 3), SCFs might decline to conduct QA related to this subscription. In that case Flows 4 through 6 would be unneeded.

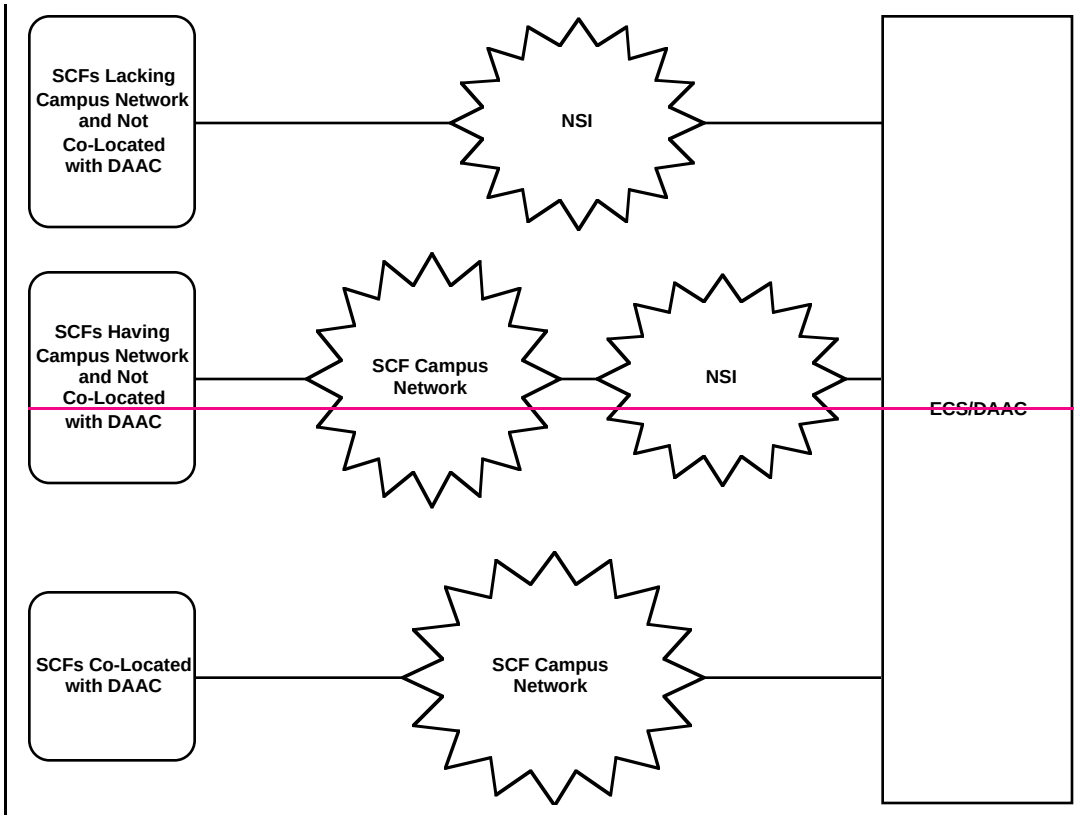
If an SCF decides to request the data that were identified in Flow 3 or any other data, the SCF would enter a data request (Flow 4). That data request could be made for all of the data specified in Flow 3, for only some of the data, or for some data in Flow 3 and other data not in Flow 3. After ECS has placed the requested data on a staging disk, ECS informs the SCF with the necessary information (Flow 5) in a Data Availability Notice that includes file names and locations for obtaining the data. The SCF can obtain some or all of the staged data via the ftp transfer in Flow 6.

4.2 Network Topology

The network connectivity between SCFs and the DAACs is illustrated in Figure 4.2-1.

SCF computers generally reside on a non-ECS local area network (LAN), referred to here as the SCF Campus Network. As examples, CERES SCF resources at LaRC reside on the LaRC campus network, and SCF resources located at a university reside on the university's network.

Further information about the network connections between ECS and NSI can be found in the interface control document between EOSDIS Core System (ECS) and NSI and the GSFC, ORNL, MSFC, SAR Distributed Active Archive Centers (DAACs).


SCFs Lacking Campus Network and Not Co-Located with DAAC
NSI
SCFs Having Campus Network and Not Co-Located with DAAC
SCF Campus Network
NSI
ECS/DAAC
SCFs Co-Located with DAAC
SCF Campus Network

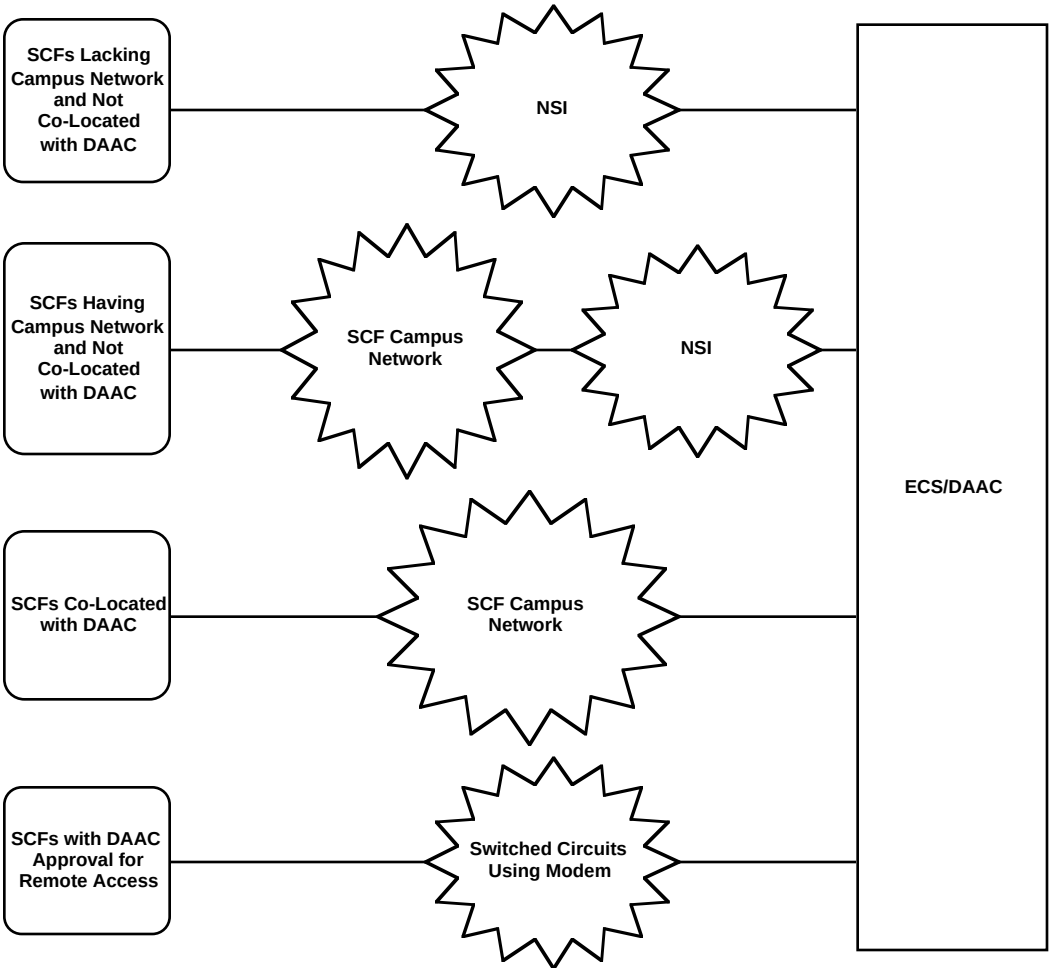


Figure 4.2-1. DAAC-SCF Network Connectivity Diagram

4.3 Internetworking Protocols

ECS-SCF internetworking services are based on protocols and standards corresponding to the Open System Interconnect (OSI) reference model. These specifications are published in International Organization for Standardization, Basic Reference Model for Systems Interconnection (reference ISO 7498).

The Transport Layer protocols used for ECS-SCF communication consist of the Transport Control Protocol (TCP), specified in RFC 793, which provides for guaranteed delivery of data. The Network Layer protocol used for ECS-SCF communication is the Internet Protocol (IP) specified in RFC 791.

All electronic mail messages are Internet electronic mail messages as defined by the Simple Mail Transfer Protocol (SMTP) (RFCs 821 and 822). SMTP runs over TCP using TCP port number 25 and a 7-bit ASCII format.

ECS uses HyperText Markup Language (HTML), Version 3.0 protocols in interfaces that are summarized as WWW. HTML is a simple markup language used to create hypertext documents that are portable from one platform to another. HTML documents are Standard Generalized Markup Language documents with generic semantics that are appropriate for representing information from a wide range of applications. The protocols for HTML are defined in HyperText Markup Language Specification Version 3.0. HTML, Version 3.0 is backwards compatible with HTML 2.0. The HyperText Transfer Protocol (HTTP) is an application-level protocol from the WWW. The basic version of HTTP is defined in the HyperText Transfer Protocol, Version 1.0, Internet-Draft. This document also defines status codes, which can include error information, that are returned as a result of transferring information via HTTP.

4.4 Kerberized File Transfers and Telnet

Kerberos is a network authentication system defined by RFC 1510 that includes a trusted third-party protocol. Although the Distributed Computing Environment (DCE) is optional for SCFs, all SCFs must host a Kerberos client and Kerberos network utilities whether or not they also host DCE as discussed in Section 4.5. ECS requires the SCFs to host Kerberos Version 5.5 (or later) in the Release A time frame and Kerberos Version TBD in the Release B time frame. ECS will provide support to SCFs for installation and use of Kerberos.

Kerberized telnet (ktelnet) is a Kerberos network utility that is required only for SCFs that have DAAC approval to remotely access specified DAAC operator interfaces. Other SCFs do not need ktelnet. SCFs must not use DCE while using those ktelnet interfaces.

SCFs hosting Kerberos with the Kerberos network utilities have the capability to use all SCF interfaces in Release A whether or not those SCFs also host a DCE client. Section 5 specifies the ability or inability of SCFs to use each Release B interface if hosting Kerberos without DCE.

4.5 Distributed Computing Environment

A standardized processing environment, Open Software Foundation's DCE is optionally used between the SCF workstations and the ECS. SCFs choosing to implement DCE are required to obtain and install DCE client software (Version 1.0.3 or compatible in the Release A time frame and Version 1.1 or compatible in the Release B time frame). The SCF can either be part of a DAAC DCE cell or, with the addition of DCE server software, can be part of an SCF DCE cell using intercell communications to the DAAC cell. Communications use TCP/IP over the NSI or LAN/WAN connections to the DAAC.

Further information about DCE can be found on the WWW using the following URL:

http://www.osf.org/dce/qna/~~http://web1.osf.org:8001/dce/index.html~~

~~Frequently asked questions about DCE are discussed on the WWW at:~~

~~http://web1.osf.org:8001/dce/faq-mauney.html~~

SCFs not hosting DCE in the Release A time frame can use all internal and external interfaces as defined in this ICD. In the Release B time frame, SCFs not hosting DCE can use the external

interfaces as defined in the body of this ICD. Information is TBD about the availability of each internal interface (see Appendix A) to such SCFs. If some Release B Client interfaces or the ECS Ingest GUI need DCE, then certain subscriptions, data requests, or ingest requests would be unavailable.

4.6 ECS Ingest Requirements

Science Data Production Software Delivery Packages can include few or many components included within the major categories of computer code (UNIX scripts, and C, FORTRAN 77 or FORTRAN 90, or ADA source code), data (coefficients and SCF-generated ancillary data, control files, test data, expected test results, and PGE activation rules), and documents. SCFs can send Science Data Production Software Delivery Packages to a DAAC for ingest either via hard media or network. In both cases, the SCF is allowed to "tar" the entire package except for the metadata and delivery record files. The purpose of the delivery record file is to provide machine readable information about each delivered file. Deliveries include at least 3 electronic files (delivery record, metadata, and one or more other files that may optionally be tar'd). ECS validates the package by examining the contents of the metadata file. The files on a tape or other hard media can be written in any order according to the SCF's discretion.

The delivery record file contains information that is required for automated ingest. This electronic file contains some, but not all, of the information in the delivery memo (reference Science User's Guide and Operations Procedure Handbook for the ECS Project, Part 4: Software Developers Guide to Preparation, Delivery, Integration and Test with ECS)that accompanies each delivery package. In the case of network ingest, the need to prepare a delivery record file is transparent to the SCF personnel who use the ECS Ingest GUI to request network ingest. This GUI prepares a delivery record file that summarizes information provided by the SCF about the requested ingest. The GUI sends the delivery record to ECS as part of the network ingest.

In the case of media ingest, the ECS Ingest GUI can also be used to prepare and save a delivery record file. However, the user must copy the delivery record file to the hard media that also contains a metadata file and at least one other file (that optionally may be tar'd). By this use of the ECS Ingest GUI, SCFs can prepare the required delivery record file without needing to structure the required information according to the Parameter Value Language (PVL) that ECS expects.

Each metadata file and delivery record file consists of a series of Parameter Value Language (PVL) statements of the form PARAMETER=Value and terminated by a semicolon. Blanks, carriage returns, line feeds, tabs, and form feeds are allowed (ignored in ECS ingest) for human readability. Statements are terminated by ";". Comments are also ignored and are initiated by "/*" and terminated by "*/". PVL statements may occupy multiple lines. A complete PVL specification can be found in the document PVLSPEC - Parameter Value Language Specification (CCSDS 641.0-B-1). This specification and a PVL tutorial are available on the WWW in the CCSDS Documents Library at

http://ddwilson.gsfc.nasa.gov/CCSDS-A.html

by requesting a keyword search on "PVL"

Tables 4.6-1 and 4.6-2 define the format and contents of the delivery record and metadata files, respectively, that must be included in all science data production software delivery packages. Table 4.6-3 defines the contens of the metadata file that must accompany Coefficients and SCF-Generated Ancillary Data.

Release A and Release B DAACs will support media ingest via 4 and 8 mm. tapes.

4.7 ECS Data Availability Notice

ECS sends an email DAN to an SCF to announce that data files have been staged for pull by the SCF via kftp. The DAN as defined in Table 4.7-1 provides the information that is necessary for the SCF to accomplish the kftp. In this message each statement consists of PARAMETER = VALUE , "/*", an explanatory text field, and "*/;". The explanatory text field consists of the information in the Description column of Table 4.7-1. Table 4.7-2 illustrates the appearance of a typical DAN.

4.8 Error Conditions

Errors may occur during use of the email and ftp/kftp interfaces in this ICD.

ECS machines may automatically send email that will not be deliverable to an SCF. If (because of a deleted account or extended machine or network down time) mail machines are unable to deliver an email message after more than 4 days of attempts, that failure including the original message are returned to the sender of the message (root of the sending machine). ECS automatically forwards that failure to a DAAC operator who manually telephones the original human subscriber or other SCF staff member if the original subscriber cannot be contacted. SCFs may send non deliverable email to ECS. Upon receipt of the non deliverable mail the SCF sender of the mail should contact DAAC user services for help. In the case of the email Data Quality Request Notification, email is used in Release B only if the user's Release B Client is not active when the notification needs to be sent. If the Client is active, the notification will occur via the user's GUI screen rather than via email.

If SCFs receive transfer errors while attempting file transfers using their ftp or kftp software, the SCFs should retry at a later time when the network error conditions may be resolved or consult their DAAC User Services for advice.

Table 4.6-1. Delivery Record PVL Parameters and Values

Parameter	Description	Type	Format/ Max Size (Bytes)	Values
ORIGINATING_SYSTEM	User name and SCF name (to identify source of delivery)	Variable String	ASCII (64 B)	Free text
OBJECT	Start of file group parameters (repeat for each group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP '
DATA_TYPE	ECS Data Type of the files in this group (N.B. that package can include coefficients and other data, documentation, and code.)	Variable String	ASCII (50 B)	'Delivered Algorithm Package'
OBJECT	Start of file parameters (repeat for each file)	Fixed String	ASCII (9 B)	'FILE_SPEC'
NODE_NAME	Name of network node on which the file resides (if network ingest)	Variable String	ASCII (64 B)	'None' (if file on media) or name (e.g., 'shark.hitc.com ')
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII (See Note 1)	directory
FILE_ID	File name	Variable String	ASCII (See Note 1)	file name
FILE_SIZE	Length of file in bytes	Unsign-ed 32 bit Integer	ASCII (10 B)	$< 4.295*10^9$
END_OBJECT	End of file parameters (repeat for each file)	Fixed String	ASCII (9 B)	'FILE_SPEC'
END_OBJECT	End of file group parameters (repeat for each group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP '

Note 1. Size does not exceed a total of 256 bytes when DIRECTORY_ID and FILE_ID are combined. Size limit excludes the null terminator

Table 4.6-2. Required Metadata for Data Production Software Delivery Package

Parameter	Description	Type	Format/ Max Size (Bytes)	Values
OBJECT	Start of statements for a class	Fixed String	ASCII (5 B)	'CLASS'
OBJECT_CLASS	The name of an ECS Object Class	Variable String	ASCII (50 B)	'DeliveredAlgorithmPackage'
OBJECT	The start of attributes for the class	Fixed String	ASCII (10 B)	'ATTRIBUTES'
AlgorithmPackageName	This attribute is the name given to the complete delivered package submitted for algorithm integration and test.	Variable String	ASCII (80 B)	Free text
AlgorithmPackageVersion	This attribute specifies the version of the package being delivered.	Variable String	ASCII (6 B)	Alphanumeric characters in the form 'major.minor' or 'xxxx.xx'
AlgorithmPackageMaturityCode	This specifies the maturity of the algorithm package as a whole. Maturity code plus version number tells version: pre-launch, preliminary, operational, stable, final.	Variable String	ASCII (20 B)	'pre-launch,' 'preliminary,' 'operational,' 'stable,' 'final'
LongName	Name of the data product to whose production this package contributes	Variable String	ASCII (128 B)	Free text. Reference: list of data products in latest version of the ECS Technical Baseline
ShortName	The official reference name of the data product to whose production this package contributes. ShortName and LongName both refer to the same data product.	Variable String	ASCII (32 B)	Free text. Reference: list of data products in latest version of the ECS Technical Baseline
END_OBJECT	Marks end of attributes for the class	Fixed String	ASCII (10 B)	'ATTRIBUTES'
END_OBJECT	Marks end of the Class	Fixed String	ASCII (5 B)	'CLASS'

Table 4.6-3. Required Metadata for Coefficients and SCF-Generated Ancillary Data Update Package

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
OBJECT	Start of statements for a class	Fixed String	ASCII (5 B)	'CLASS'
OBJECT_CLASS	The name of an ECS Object Class	Variable String	ASCII (50 B)	'Coeff&SCFAncData'
OBJECT	The start of attributes for the class	Fixed String	ASCII (10 B)	'ATTRIBUTES'
PlatformShortName	Acronym or short name of the spacecraft carrying the Sensor associated with this data	Variable String	ASCII (16 B)	Free text. Reference Mission Baseline in latest ECS Technical Baseline
SensorShortName	Acronym or short name of the sensor for which the data are delivered	Variable String	ASCII (16 B)	Free text. Reference Mission Baseline in latest ECS Technical Baseline
Coeff&SCFAncDataName	The name of a particular package of Coefficients and SCF-Generated Data submitted for algorithm integration and test	Variable String	ASCII (80 B)	Free text
ReleaseDate	The date of a particular release and version of Coefficients and SCF-Generated Data	Variable String	ASCII (20 B)	yyyy-mm-ddThh:mm:ssZ, where T and Z are literals.
VersionNumber	The version number of a particular release of Coefficients and SCF-Generated Data	Variable String	ASCII (6 B)	1-6 printable characters
END_OBJECT	Marks end of attributes for the class	Fixed String	ASCII (10 B)	'ATTRIBUTES'
END_OBJECT	Marks end of the Class	Fixed String	ASCII (5 B)	'CLASS'

Table 4.7-1. DAN PVL Parameters and Values

Parameter	Description	Type	Format/ Max Size (Bytes)	Values
REQUEST_TYPE	Examples: 'Test Products' 'Product History'	Variable String	ASCII (32 B)	'Operational Data Production S/W' 'Test Products' 'Data to QA' 'Processing Status' 'Resource Usage' 'Product History' 'Coefficients & SCF-Gen Ancillary'
EXPIRATION_TIME	ISO Time when data may be deleted from ECS staging area	Fixed String	ASCII (20 B)	yyyy-mm-ddThh:mm:ssZ, where T and Z are literals.
OBJECT	Start of file group parameters (repeat for each group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP'
NODE_NAME	Name of ECS workstation containing data	Variable String	ASCII (64 B)	e.g., shark.hitc.com
GRANULE_ID	ECS Granule ID	Variable String	ASCII (64 B)	Valid ECS Granule ID as defined in the product metadata
OBJECT	Start of the parameters for a file (repeat for each file)	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location without file name	Variable String	ASCII (see Note 1)	directory
FILE_ID	File name without directory	Variable String	ASCII (see Note 1)	file name
END_OBJECT	End of file parameters (repeat for each file)	Fixed String	ASCII (9 B)	'FILE_SPEC'
END_OBJECT	End of file group parameters (repeat for each group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP'

Note 1. Size does not exceed a total of 256 bytes when DIRECTORY_ID and FILE_ID are combined. Size limit excludes the null terminator

Table 4.7-2. Sample Data Availability Notice for Two Files

```
REQUEST_TYPE = ~~~          /* Examples: 'Test Products' 'Product History' */;
EXPIRATION_TIME = ~~~       /* ISO Time when data may be deleted from ECS staging area */;
OBJECT = FILE_GROUP         /* Start of the parameters for a file group (repeat for each group of files) */;
NODE_NAME = ~~~             /* Name of ECS workstation containing data */;
GRANULE_ID = ~~~            /* Valid ECS Granule ID as defined in the product metadata */
NODE_NAME = ~~~             /* Name of ECS workstation containing data */;
  OBJECT = FILE_SPEC        /* Start of file specifications for file */ ;
    DIRECTORY_ID = ~~~      /* File directory location without file name */;
    FILE_ID = ~~~           /* File name without directory */;
  END_OBJECT = FILE_SPEC    /* End of file parameters (repeat for each file) */;
  OBJECT = FILE_SPEC        /* Start of file specifications for 1 file */ ;
    DIRECTORY_ID = ~~~      /* File directory location without file name */;
    FILE_ID = ~~~           /* File name without directory */ ;
  END_OBJECT = FILE_SPEC    /* End of file parameters (repeat for each file) */;
                            /* Add more file specifications here if more than 2 files are staged */
END_OBJECT = FILE_GROUP     /* End of parameters for a group of files. Repeat as necessary*/;
```

5. Data Flows

Section 5 builds upon the general foundation that the Data Exchange Framework in Section 4 provides. The following sections provide detailed descriptions of each data flow between the ECS and SCFs (excluding those between ECS servers and the ECS-provided software that are resident on SCF computers). Figure 3.1-1 shows these external interfaces, and Table A-1 (in Appendix A) summarizes all interfaces including internal interfaces.. The interfaces defined in Section 5 apply to both Release A and Release B unless otherwise specified. Subsequent sections describe the functional purpose of each flow and specify the following additional information about the flow:

- The system that initiates the flow
- How the data are delivered
- How frequently the flow occurs. This includes flows from all SCFs that coexist with a particular ECS release rather than flow frequency for a typical SCF.
- Data volume/sizing estimates

Additional qualitative information describing the data flows in this section can be found in the Science User's Guide and Operations Procedure Handbook for the ECS Project, Part 4: Software Developers Guide to Preparation, Delivery, Integration and Test with ECS.

5.1 ECS Software Package External Interfaces

5.1.1 ECS Software Package Subscription Acknowledgment

This external interface, which applies only to Release B, consists of an acknowledgment message from ECS to the SCF confirming that the SCF has subscribed to ECS software. (Although this software targets SCF needs, the distribution of the software is unlimited.) Table 5.1.1-1 defines the acknowledgment message format and content.

Table 5.1.1-1. Description of ECS Software Package Subscription Acknowledgment

Data Flow Characteristic	Release B Description
Source	ECS
Destination	SCF
Interface Method	email (SMTP)/WWW (TBD by Release B CDR)
Contents	TBD by Release B CDR
Format	TBD by Release B CDR
Expected Volume	TBD by Release B CDR
Expected Frequency	TBD by Release B CDR

5.1.2 ECS Software Package Announcement

In Release A this interface, consists of an email message sent by ECS staff to all SCFs to inform the SCFs that an ECS software package is available for their pickup from the ECS Data Handling System (EDHS) using password-protected ftp. The package announcements pertain to both the initial package announcement and announcements of subsequent updates. ECS initiates this email flow after receiving authorization by ESDIS.

This interface is automated in Release B as TBD by Release B CDR (an email message or a WWW home page).

Table 5.1.2-1 defines the message format and content for both releases.

Table 5.1.2-1. Description of ECS Software Package Announcement

Data Flow Characteristic	Release A Description	Release B Description
Source	ECS Staff	ECS
Destination	SCF	SCF
Interface Method	email (SMTP)	TBD by Release B CDR
Contents	Internet address (edhs1.gsfc.nasa.gov or 192.150.28.25), the group, password, detailed directions for obtaining and installing the software, the total file size, and a list of the available files	TBD by Release B CDR
Format	Free form mail message to be read by a human	TBD by Release B CDR
Expected Volume	< 10 KB	TBD by Release B CDR
Expected Frequency	2/year	TBD by Release B CDR

5.1.3 ECS Software Package

The ECS Software Package for releases A and B includes the SCF Toolkit, Local Data Access Service, and any other software that ECS provides to the SCFs, including the Release A Client and the ECS Ingest GUI. The SCF toolkit contains the tools that the SCF needs to develop science data production software for use by ECS. The toolkit delivery includes the SCF version of the Science Data Processing (SDP) Toolkit, which includes tools for generic input/output, status message facility, process control, geolocation, and coordinate system conversion. (Refer to the latest SDP Toolkit Users Guide for the ECS Project for details.)

The format and content of the ECS Software Packages are defined in Table 5.1.3-1. The SCF initiates the ftp flow.

Table 5.1.3-1. Description of ECS Software Package

Data Flow Characteristic	Release A Description	Release B Description
Source	ECS	ECS
Destination	SCF	SCF
Interface Method	Password-protected ftp	kftp
Contents	SCF Toolkit and other software	SCF Toolkit and other software
Format	tar or compressed tar	tar or compressed tar
Expected Volume	1 GB	1 GB (TBR)
Expected Frequency	2/year	2/year (TBR)

5.2 Integration and Test Requirements External Interfaces

5.2.1 Data Availability Notice for Integration and Test Requirements

This external interface, which applies only to Release B, informs SCFs that the Integration and Test Requirements are available for transfer from ECS using Kerberized ftp. The format and content of the Integration and Test Requirements is defined in Table 5.2.1-1.

Table 5.2.1-1. Description of Data Availability Notice for Integration and Test Requirements

Data Flow Characteristic	Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1
Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Monthly

5.2.2 Integration and Test Requirements

Section 5-8 of the Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS (DID 205, Part 4) provides the integration and test requirements for science data production software. However, the indicated Science Software Integration and Test Procedures Document between each DAAC and Instrument Team takes precedence over DID 205, Part 4.

Release A SCFs can electronically access this document from EDHS on the WWW. In Release B SCFs transfer the Integration and Test Requirements from ECS by Kerberized ftp.

The format and content of the data flow are defined in Table 5.2.2-1.

Table 5.2.2-1. Description of Integration and Test (I&T) Requirements

Data Flow Characteristic	Release A Description	Release B Description
Source	ECS	ECS
Destination	SCF	SCF
Interface Method	WWW URL: http://edhs1.gsfc.nasa.gov/misc/docsw/docswcat.html (Scroll to document number 205-CD-002-002)	kftp
Contents	Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS (DID 205, Part 4)	Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS (DID 205, Part 4) (TBR)
Format	ASCII, RTF, ps, or pdf	ASCII, RTF, ps, or pdf (TBR)
Expected Volume	1.5 MB if Postscript. Less for other formats	1.5 MB if Postscript. Less for other formats (TBR)
Expected Frequency	2/year by SCFs	2/year by SCFs

5.3 Interactive Session Dialog External Interfaces

5.3.1 Interactive Session Dialog

This external interface applies only to Release A. (In Release B the Interactive Session Dialog is an internal interface using the Release B Client.) The Release A dialog between DAAC or ECS staff and the SCFs consists of various email and voice messages exchanged between the science software integration and test personnel and the SCF investigator team during the science software integration and test process. This dialog takes place in support of the integration and test process of data production software.

The format and content of the Release A email messages are defined in Table 5.3.1-1.

Table 5.3.1-1. Description of Interactive Session Dialog

Data Flow Characteristic	Release A Description
Source	Either (1) DAAC or ECS staff or (2) SCF
Destination	Either (1) SCF or (2) DAAC or ECS staff
Interface Method	email (SMTP)
Contents	Technical and science issues, operations support, integration and test status, test coordination including requests for results of tests, test execution scripts, and solutions to minor problems.
Format	Free form mail message to be read by humans
Expected Volume	< 10 KB (per message)
Expected Frequency	1000/year

5.3.2 Science Software Integration and Test Status

This interface allows SCFs to use Kerberized ftp to pull Science Software Integration and Test log files from ECS if the DAAC has not used email to provide the SCF with the test status.

The format and content of the integration and test status files are defined in Table 5.3.2-1.

Table 5.3.2-1. Description of Science Software Integration and Test Status

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	Log files from testing of SCF-developed data production software
Format	ASCII
Expected Volume	1 MB
Expected Frequency	Daily to Weekly

5.4 Remote Access Session Dialog External Interfaces

SCFs can use these interfaces at DAAC discretion in both Release A and Release B to carry out remote integration and test of their science data production software in DAAC test environments. If the DAAC authorizes use of these interfaces, an SCF member can remain physically located at the SCF while using an SCF machine for interactive access to the following software that is running at the DAAC:

- The Science Data Processing Toolkit with DAAC extensions (reference SDP Toolkit Primer for the ECS Project)
- The planning and data processing user interfaces (references: Release B SDPS Planning Subsystem Design Specification for the ECS Project and Release-A SDPS Planning Subsystem Design Specification)
- Test and execution analysis tools (reference Interim Release One (Ir1) Maintenance and Operations Procedures and subsequent M&O procedures documents for Release A and Release B)

These interfaces require use of Kerberized telnet, X Window System (X11 protocol), and Motif and require connection via Internet or via dial up modems using switched circuits. SCF and DAAC routers provide further security by restricting access to a list of authorized SCF and DAAC host addresses and ports as established during the process by which the SCF obtains DAAC approval for remote I&T access. The SCF must have 1) one or more modems for the dial up option or 2) a router/firewall for the Internet option.

The DAAC provides authorized SCFs with information including the following:

- Setup instructions for the DAAC I&T application through which the SCF can access all I&T tools
- The unix command for invoking that DAAC I&T application.
- The modem telephone numbers (if the SCF intends to use that option)

5.4.1 Remote Access Session Dialog via Modem

The format and content of the interface are defined in Table 5.4.1-1.

Table 5.4.1-1. Description of Remote Integration and Test via Modem

Data Flow Characteristic	Release A and Release B Description
Source	SCF (SCF initiates the session. Data flows in both directions during the session.)
Destination	DAAC
Interface Method	28.8 kbps V.34 modem Ktelnet (Kerberos version 5.5 or later) X server (X11 Release 5) Motif version 1.2.*, where the * represents a positive integer
Contents	Determined by the contents of the GUIs that the SCF accesses
Format	Determined by X11 protocol
Expected Volume	Depends on user's use of the interface
Expected Frequency	Zero frequency without DAAC approval. Daily sessions by approved SCFs during periods of active I&T and rare otherwise.

5.4.2 Remote Access Session Dialog via Internet

The format and content of the interface are defined in Table 5.4.2-1.

Table 5.4.2-1. Description of Remote Integration and Test via Internet

Data Flow Characteristic	Release A and Release B Description
Source	SCF (SCF initiates the session. Data flows in both directions during the session.)

Destination	DAAC
Interface Method	Internet connectivity via an SCF fire wall/router Ktelnet (Kerberos version 5.5 or later) X server (X11 Release 5) Motif version 1.2.*, where the * represents a positive integer
Contents	Determined by the contents of the GUIs that the SCF accesses
Format	Determined by X11 protocol
Expected Volume	Depends on user's use of the interface
Expected Frequency	Zero frequency without DAAC approval. Daily sessions by approved SCFs during periods of active I&T and rare otherwise.

5.4 Data Production Software Delivery Package External Interfaces

5.4.1 Data Production Software Delivery Package via Network

The SCFs use this Kerberized ftp interface to electronically deliver or update a Science Data Production Software Delivery Package, whose contents are governed by the Science User's Guide and Operations Procedure Handbook for the ECS Project, Part 4: Software Developers Guide to Preparation, Delivery, Integration and Test with ECS. However, for particular SCF-DAAC pairs, the procedures documents to which those pairs agree take precedence over DID 205, Part 4. This software delivery from the SCF to the DAAC consists of the files that the SCF specifies by using the ECS Ingest GUI.

The format and content of the interface are defined in Table 5.4.1-1. Media ingest can be used as an alternative delivery mechanism.

5.4.2 Data Production Software Delivery Package via Media

The SCFs use this interface to deliver a Science Data Production Software Delivery Package or update on media. Section 4.6 specifies the media types that can be ingested.

The format and content of the interface are defined in Table 5.4.2-1.

Table 5.4.1-1. Description of Data Production Software Delivery Package via Network

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	General contents as specified in Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS (DID 205, Part 4) and particular files as requested for ingest by the SCF via the ECS Ingest GUI. However, for particular SCF-DAAC pairs, the procedures documents to which those pairs agree take precedence over DID 205, Part 4.
Format	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML Other: All files, except for metadata and delivery record files, optionally may be tar'd (machine readable)
Expected Volume	Depends on number and the size of the components in the package
Expected Frequency	2/month

Table 5.4.2-1. Description of Data Production Software Delivery Package via Media

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media ingest
Contents	General contents as specified in Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS (DID 205, Part 4) and particular files as specified in the delivery record file (also on same media). However, for particular SCF-DAAC pairs, the procedures documents to which those pairs agree take precedence over DID 205, Part 4.
Format	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML Other: All files, except for metadata and delivery record files, optionally may be tar'd (machine readable)
Expected Volume	Depends on number and the size of the components in the package
Expected Frequency	2/month

5.5 Operational Data Production Software Package External Interfaces

5.5.1 Request for Operational Data Production Software Package

During the software integration and test process each delivered Science Data Production Software Delivery Package may be changed before becoming accepted for routine operational use in data production. This interface enables SCFs to obtain a copy of the Operational Data Production Software Package.

Table 5.5.1-1. Description of Request for Operational Data Production Software Package

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	ECS
Interface Method	WWW Browse, URL depending on Instrument, PGE, PGE version ???
Contents	not applicable (WWW browser selections)
Format	HTML
Expected Volume	40 KB
Expected Frequency	4/year

5.5.2~~1~~ Data Availability Notice for Operational Data Production Software Package

~~During the software integration and test process each delivered Science Data Production Software Delivery Package may be changed before becoming accepted for routine operational use in data production. This interface enables SCFs to obtain a copy of the Operational Science Data Production Software Package.~~ This interface notifies the SCF as that a requested Operational Data Production Software Package is available for transfer from ECS via kftp. The data availability notice is defined in Section 4.6.

The format and content of the data availability notice ~~email messages~~ are defined in Table 5.5.1~~2~~-1.

Table 5.5.2~~1~~-1. Description of Data Availability Notice for Operational Data Production Software Package

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1.

Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	10 KB
Expected Frequency	4/year

5.5.32 Operational ~~Science~~ Data Production Software Package

The SCFs use this interface to electronically pull a copy of an Oo~~o~~perational ~~Science~~ Data Production Software Delivery Package. The format and content of the data flows are defined in Table 5.5.2~~2~~3-1.

5.6 Results of Testing Interfaces

5.6.1 Test Product Availability Message during Software Integration and Test

This and the following email interface give the SCF instructions for obtaining test results. This manual email interface applies before the test results are archived by ECS. A DAAC operator sends this availability message after receiving a email request for test results. That email request is part of the Interactive Session Dialog.

The format and content of this Test Product Availability Message are defined in Table 5.6.1-1.

Table 5.5.2~~2~~3-1. Description of the Operational Science Data Production Software Package

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML Other: All files, except for metadata and delivery record files, optionally may be tar'd (machine readable)
Format	tar, ASCII, rtf, ps, pdf, HTML, binary executables, octal, hex (machine readable)
Expected Volume	Depends on the size of the package as delivered and as modified during integration and test
Expected Frequency	4/year (TBR for Release B)

Table 5.6.1-1. Description of Test Product Availability Messages During Software Integration and Test

Data Flow Characteristic	Release A and Release B Description
Source	DAAC
Destination	SCF
Interface Method	email (SMTP)
Contents	Suggested contents may be modified by DAAC operator: number of staged files, the total bytes, DAN sequence number, expiration time, ECS data types, staging machine name, directory IDs, file names, and file sizes
Format	free form message to be read by a human
Expected Volume	10 KB
Expected Frequency	Daily to Weekly (TBR for Release B)

5.6.2 Request for Test Products after Software Integration and Test

After the software integration and test process, Test Products can be requested using this interface.

Table 5.6.2-1. Description of Request for Test Products after Software Integration and Test

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	ECS
Interface Method	WWW Browse, URL depending on Instrument, PGE, PGE version ???
Contents	not applicable (WWW browser selections)
Format	HTML
Expected Volume	40 KB
Expected Frequency	Monthly

5.6.32 Data Availability Notice for Test Products after Software Integration and Test

This and the previous email interface give the SCF instructions for obtaining test results after the SCF has requested that information using either the WWW InterfaceRelease A Client or the Release B Client. This interface applies after the test results are archived by ECS. The format and content of the DAN are defined in Table 5.6.32-1.

Table 5.6.32-1. Description of Data Availability Notice for Test Products After Software Integration and Test

Data Flow Characteristic	Release A and Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1
Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Monthly (TBR for Release B)

5.6.3~~3~~4 Test Products

This Kerberized ftp interface enables SCFs to pull test products from ECS. SCFs use this interface after receiving one of two possible notices: one manually sent by a DAAC operator before the software has completed its integration and test process, and the other (a DAN) automatically sent by ECS after integration and test.

The format and content of the data flow are defined in Table 5.6.~~3~~4-1.

Table 5.6.34-1. Description of the Test Products

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	As specified by SCF's test plan
Format	ASCII
Expected Volume	2 TB (maximum)
Expected Frequency	60/year (TBR for Release B)

5.6.45 Test Product Reviews

The Test Product Reviews interface exists in both releases A and B. But the reviews have an external interface only in Release A. The definition of the Release B internal interface using the Release B Client is not covered in this section.

The Release A interface enables SCFs to send a free form email message to the DAAC containing the SCF's review of the test products. The format and content of the email messages are defined in Table 5.6.45-1.

Table 5.6.45-1. Description of Test Product Reviews

Data Flow Characteristic	Release A Description
Source	SCF
Destination	DAAC
Interface Method	email (SMTP)
Contents	SCF's QA review of the test results
Format	Free form message to be read by a human
Expected Volume	< 10 KB
Expected Frequency	60/year

5.7 QA External Interfaces

5.7.1 QA Notification Specification

This QA subscription interface exists in both releases A and B but is an external interface only in Release A. The Release B internal interface definition is not covered in this section.

This Release A interface allows SCFs to enter a QA notification subscription by sending an email message to the DAAC. This subscription specifies that ECS should notify the SCF whenever any of a specified set of triggering events occurs.

The format and content of the Release A email messages are defined in Table 5.7.1-1.

Table 5.7.1-1. Description of QA Notification Specification

Data Flow Characteristic	Release A Description
Source	SCF
Destination	DAAC
Interface Method	email (SMTP)
Contents	Subscription triggering events (one or both can be specified): o Occurrence of changes in the core metadata (e.g., QA parameters) of a specified data product o Insertion of new science data product into the ECS archive
Format	Free form message to be read by a human
Expected Volume	< 10 KB
Expected Frequency	2/year

5.7.2 QA Notification Specification Acknowledgment

This email interface enables the DAAC operator to confirm receipt of a subscription for QA data (QA Notification Specification) from the SCF. The interface exists in both releases but is external in Release A and internal (Release B Client) in Release B. The Release A email message is defined in Tables 5.7.2-1 and 5.7.2-2.

Table 5.7.2-1. Description of QA Notification Specification Acknowledgment

Data Flow Characteristic	Release A Description
Source	DAAC
Destination	SCF
Interface Method	email (SMTP)
Contents	Required to include myDescription, myDurationType, myExpirationDate, and SUBSCRIPTION_ID as Defined in Table 5.7.2-2
Format	Free form message. Normally sent and read by a human
Expected Volume	< 10 KB
Expected Frequency	2/year

Table 5.7.2-2. Required Information in QA Notification Specification Acknowledgment

Field	Description	Type	Format/Max Size (Bytes)	Values
myDescription	Describes subscription as being triggered either by a metadata update or archival of new data	Variable String	ASCII (80 B)	Free text
myDurationType	Subscription done once or forever	Variable String	ASCII (11 B)	'ONCE' 'OUTSTANDING'
myExpirationDate	ISO Date when a subscription is scheduled to be removed from system	Variable String	ASCII (20 B)	'NEVER' or yyyy-mm-ddThh:mm:ssZ, where T and Z are literals.
SUBSCRIPTION_ID	ECS-returned ID consisting of a universal reference	Variable String	ASCII (20 B)	Printable characters

5.7.3 Data Quality Request Notification

This interface enables ECS to automatically notify the SCF whenever conditions are met that indicate a need for QA by the SCF. ECS sends the notification to the SCF whenever conditions develop as specified by the SCF in its QA Notification Specification. The notification is an ECS-generated email message with format and content that are defined in Tables 5.7.3-1 and 5.7.3-2. In this message each statement consists of PARAMETER = VALUE , "/*", an explanatory text field, and "*/;". The explanatory text field consists of the information in the Description column of Table 5.7.3-2.

Table 5.7.3-1. Description of Data Quality Request Notification

Data Flow Characteristic	Release A and Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP) (Email is always used in Release A and used in Release B whenever subscriber's Release B Client is not active.)
Contents	Specified in Table 5.7.3-2
Format	Defined in Table 5.7.3-2 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Daily

Table 5.7.3-2. PVL Statements and Values for Data Quality Request Notification

Field	Description	Type	Format/ Max Size (Bytes)	Values
OBJECT	Start of a group of statements	Fixed String	ASCII (10 B)	'ATTRIBUTES'
myEventName	Unique name of triggering event	Fixed String	ASCII (20 B)	'INSERT' 'UPDATE'
myDescription	Description of triggering event	Variable String	ASCII (80 B)	Free text
GRANULE_ID	Granule ID of the stimulating object	Variable String	ASCII (64 B)	Valid ECS Granule ID as defined in the product metadata
END_OBJECT	Indicates end of a group of statements	Fixed String	ASCII (10 B)	'ATTRIBUTES'

5.7.4 Data Availability Notice for Data Delivered for QA

This email message from ECS notifies the SCF that data for QA have been staged. The format and content of the DAN are defined in Table 5.7.4-1.

Table 5.7.4-1. Description of Data Availability Notice for Data Delivered for QA

Data Flow Characteristic	Release A and Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1

Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Daily

5.7.5 Data Delivered for QA

Via this interface SCFs can pull data that require manual QA by the SCF staff. The format and content of the data flow defined in Table 5.7.5-1.

Table 5.7.5-1. Description of Data Delivered for QA

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	All or part of the staged data as specified in a previous DAN
Format	HDF
Expected Volume	75 GB (maximum)
Expected Frequency	Daily

5.7.6 QA Metadata Updates

Via this interface, the SCF can update the QA metadata for reviewed products, using a WWW form accessible via a WWW browser. The form will allow the SCF to enter the values for science QA metadata for one or several science products.

Table 5.7.6-1. Description of Request for QA Metadata Updates

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	ECS
Interface Method	WWW Form
Contents	QA Metadata Values
Format	HTML
Expected Volume	<10 KB
Expected Frequency	Daily

5.8 Processing Status External Interfaces

5.8.1 RequestData Availability Notice for Processing Status

This interface permits the SCF to request current processing status from ECS.email message from ECS notifies the SCF that product processing status information has been staged. The format and content of the interfaceDAN are defined in Table 5.8.1-1.

Table 5.8.1-1. Description of Data Description of Availability NoticeRequest for Processing Status

Data Flow Characteristic	Release A and Release B Description
Source	SCFECS (automated)
Destination	ECSSCF
Interface Method	WWW Browseemail (SMTP)
Contents	note applicable (WWW Browse selections)Defined in Table 4.7-1
Format	HTMLDefined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Weekly

5.8.2 Processing Status

This interface provides the requested processing status toallows the SCF to obtain the status of product processing via WWW, in response to the WWW access requestkftp from ECS. The format and content of the data flow are defined in Table 5.8.2-1. This interface includesalso provides status ofafter reprocessing.

Table 5.8.2-1. Description of Processing Status

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	WWWkftp
Contents	Processing Status ReportAll or part of the staged data as specified in a previous DAN
Format	ASCII
Expected Volume	100 Kbytes1 MB
Expected Frequency	Weekly

5.9 Resource Usage External Interfaces

5.9.1 RequestData Availability Notice for Resource Usage

This interface permits the SCF to request resource usage data from ECS. The format and content of the interface are defined in Table 5.9.1-1.

This email message from ECS notifies the SCF that Resource Usage information has been staged. The format and content of this DAN are defined in Table 5.9.1-1.

Table 5.9.1-1. Description of RequestData Availability Notice for Resource Usage

Data Flow Characteristic	Release A and Release B Description
Source	SCFECS (automated)
Destination	ECSSCF
Interface Method	eWWW Browsemail (SMTP)
Contents	Not Applicable (WWW Browse selections)Defined in Table 4.7-1
Format	HTMLDefined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Weekly

5.9.2 Resource Usage

This interface provides the requested allows SCFs to obtain Resource Usage information to the SCFfrom ECS. The format and content of the data flow are defined in Table 5.9.2-1.

Table 5.9.2-1. Description of Resource Usage

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	WWW~~kftp~~
Contents	Resource UsageReport~~All or part of the staged data as specified in a previous DAN~~
Format	ASCII
Expected Volume	100 Kbytes~~1 MB~~
Expected Frequency	Weekly

5.10 Product History External Interfaces

5.10.1 Data Availability Notice for Product History

This email message from ECS notifies the SCF that Product History information has been staged. The format and content of the DAN are defined in Table 5.10.1-1.

Table 5.10.1-1. Description of Data Availability Notice for Product History

Data Flow Characteristic	Release A and Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1
Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Weekly

5.10.2 Product History

This interface allows the SCF to obtain Product History information from ECS. The format and content of the data flow defined in Table 5.10.2-1.

Table 5.10.2-1. Description of Product History

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	All or part of the staged data as specified in a previous DAN
Format	ASCII
Expected Volume	10 MB
Expected Frequency	Monthly

5.11 Reprocessing Request External Interfaces

5.11.1 Reprocessing Request via Email

In Release A or Release B the SCF may sends Reprocessing Requests to the DAAC staff as email messages. ~~These messages can include optional run time parameters. The Release B implementation of this request is TBD by Release B CDR.~~ The format and content of this request are defined in Table 5.11.1-1.

Table 5.11.1-1. Reprocessing Request

Data Flow Characteristic	Release A and Release B Description	~~Release B Description~~
Source	SCF	~~SCF~~
Destination	DAAC	~~ECS~~
Interface Method	email (SMTP)	~~TBD by Release B CDR~~
Contents	o Product Type o The time window for which the product should be regenerated o Optional run time parameters	~~TBD by Release B CDR~~
Format	Free form message to be read by a human	~~TBD by Release B CDR~~
Expected Volume	< 10 KB	~~< 10 KB~~
Expected Frequency	Weekly	~~Weekly~~

5.11.2 Reprocessing Request Email Acknowledgment

In Release A and Release B the DAAC acknowledges its receipt of the SCF's email Reprocessing Request by replying to the SCF in an email message that includes the SCF's original request. ~~The Release B implementation of this acknowledgment is TBD by Release B CDR.~~ The format and content of the ~~Release A~~ acknowledgment are defined in Table 5.11.2-1.

Table 5.11.2-1. Reprocessing Request Acknowledgment

Data Flow Characteristic	Release A and Release B Description	~~Release B Description~~
Source	DAAC	~~ECS~~
Destination	SCF	~~SCF~~
Interface Method	email (SMTP)	~~TBD by Release B CDR~~
Contents	"This is an acknowledgment of the receipt of the following Reprocessing Request: . . . "	~~TBD by Release B CDR~~
Format	Determined by above "Contents"	~~TBD by Release B CDR~~
Expected Volume	< 10 KB	~~< 10 KB~~
Expected Frequency	Weekly	~~Weekly~~

5.11.3 Reprocessing Requests via Ktelnet/X11 Interfaces

SCFs can use these interfaces at DAAC discretion in both Release A and Release B to request reprocessing of their science data.

These interfaces require use of Kerberized telnet, X Window System (X11 protocol), and Motif and require connection via Internet or via dial up modems using switched circuits. SCF and DAAC routers provide further security by restricting access to a list of authorized SCF and DAAC host addresses and ports. This interface configuration (which may also be used by the SCFs for remote I&T access) would be established as part of the process by which the SCF obtains DAAC approval for remote I&T, and retained after I&T to support the reprocessing request submission. Alternatively, the interface configuration may be established solely for submission of reprocessing requests.

The SCF must have 1) one or more modems ~~and a terminal server~~ for the dial up option or 2) a router/firewall for the Internet option. The following paragraphs describe these options

5.11.3.1 Reprocessing Request via Internet

The format and content of the interface are defined in Table 5.11.3.1-1.

Table 5.11.3.1-1 Description of Reprocessing Request Interface via Internet

Data Flow Characteristic	Release A and Release B Description
Source	SCF (SCF initiates the session. Data flows in both directions during the session)
Destination	DAAC
Interface Method	Internet connectivity via an SCF fire wall/router Ktelnet (Kerberos version 5.5 or later) X server (X11 Release 5) Motif version 1.2.*, where the * represents a positive integer

Contents	GUI interface for input of information to specify the reprocessing request, such as : 1. Product Type 2. The time window for which the product should be generated 3. Optional run time parameters
Format	Determined by the X11 protocol
Expected Volume	< 10 KB
Expected Frequency	Weekly

5.11.3.2 Reprocessing Request via Modem

The format and content of the interface are defined in Table 5.11.3.1-1.

Table 5.11.3.2-1 Description of Reprocessing Request Interface via Modem

Data Flow Characteristic	Release A and Release B Description
Source	SCF (SCF initiates the session. Data flows in both directions during the session)
Destination	DAAC
Interface Method	28.8 kbps V.34 modem Ktelnet (Kerberos version 5.5 or later) X server (X11 Release 5) Motif version 1.2.*, where the * represents a positive integer

Contents	GUI interface for input of: 1. Product Type 2. The time window for which the product should be generated 3. Optional run time parameters
Format	Determined by the X11 protocol
Expected Volume	< 10 KB
Expected Frequency	Weekly

5.12 Coefficients and SCF-Generated Ancillary Data External Interfaces

5.12.1 Data Availability Notice for Coefficients and SCF-Generated Ancillary Data

ECS sends this email message as notification that requested coefficients or SCF-generated ancillary data files have been staged.

The format and content of this DAN are defined in Table 5.12.1-1.

Table 5.12.1-1. Description of Data Availability Notice for Coefficients and SCF-Generated Ancillary Data

Data Flow Characteristic	Release A and Release B Description
Source	ECS (automated)
Destination	SCF
Interface Method	email (SMTP)
Contents	Defined in Table 4.7-1
Format	Defined in Table 4.7-1 Normally read by a human (also parsable by machine).
Expected Volume	< 10 KB
Expected Frequency	Depends on particular files being requested. Range from weekly to yearly.

5.12.2 Coefficients and SCF-Generated Ancillary Data

This interface allows SCFs to obtain Coefficients and SCF-Generated Ancillary Data from ECS. The format and content of the data flow are defined in Table 5.12.2-1.

Table 5.12.2-1. Description of Coefficients and SCF-Generated Ancillary Data

Data Flow Characteristic	Release A and Release B Description
Source	ECS
Destination	SCF
Interface Method	kftp
Contents	All or part of the staged data as specified in a previous DAN
Format	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML (machine readable)
Expected Volume	Depends on the particular files being requested.
Expected Frequency	Depends on the particular files being requested. Range from weekly to yearly.

5.12.3 Coefficients and SCF-Generated Ancillary Data Update Package Network Ingest

SCFs use this interface to electronically deliver to ECS coefficients and ancillary data as an alternative to delivery as part of a Data Production Software Delivery Package. The format and content of the interface are defined in Table 5.12.3-1. Media ingest can be used as an alternative delivery mechanism.

5.12.4 Coefficients and SCF-Generated Ancillary Data Update Package Media Ingest

SCFs use this interface for coefficients and ancillary data that are transported on media from the SCF to a DAAC as an alternative to delivery as part of a Data Production Software Delivery Package. The format and content of the interface are defined in Table 5.12.4-1. Section 4.5 specifies the media types that can be ingested. Network ingest can be used as an alternative delivery mechanism.

Table 5.12.3-1. Description of Coefficients and SCF-Generated Ancillary Data Update Package Network Ingest

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	Determined by SCF
Format	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML Other: All files, except for metadata and delivery record files, optionally may be tar'd (machine readable)
Expected Volume	Depends on the particular files being ingested
Expected Frequency	Depends on the particular files being ingested. Range from weekly to yearly.

Table 5.12.4-1. Description of Coefficients and SCF-Generated Ancillary Data Update Package Media Ingest

Data Flow Characteristic	Release A and Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media ingest
Contents	Determined by SCF
Format	Code: ASCII, 32-bit binary, 64-bit binary Data: HDF-EOS, HDF, 32-bit binary, 64-bit binary, ASCII Documents: rtf, ps, pdf, HTML Other: All files, except for metadata and delivery record files, optionally may be tar'd (machine readable)
Expected Volume	Depends on the particular files being ingested
Expected Frequency	Depends on the particular files being ingested. Range from weekly to yearly.

5.13 Special Products External Interfaces

All interfaces in this section are related to Special Products and are allocated to Release B but not to Release A.

5.13.1 Special Products via Network

ECS uses this Release B interface in order to ingest Special Products that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.1-1 although to date no specific special products have been identified.

Table 5.13.1-1. Description of Special Products via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.2 Special Products via Media

DAACs use this Release B interface in order to ingest Special Products that are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.2-1 although to date no specific special products have been identified.

Table 5.13.2-1. Description of Special Products via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.3 Ancillary Data via Network

ECS uses this Release B interface in order to ingest ancillary data that are related to special products and that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.3-1.

Table 5.13.3-1. Description of Ancillary Data via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.4 Ancillary Data via Media

DAACs use this Release B interface in order to ingest Ancillary Data that are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.4-1.

Table 5.13.4-1. Description of Ancillary Data via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.5 Calibration Data via Network

ECS uses this Release B interface in order to ingest calibration data that are related to special products and that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.5-1.

Table 5.13.5-1. Description of Calibration Data via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.6 Calibration Data via Media

DAACs use this Release B interface in order to ingest Calibration Data that are related to special products and are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.6-1.

Table 5.13.6-1. Description of Calibration Data via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.7 Correlative Data via Network

ECS uses this Release B interface in order to ingest Correlative Data that are related to special products and that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.7-1.

Table 5.13.7-1. Description of Correlative Data via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.8 Correlative Data via Media

DAACs use this Release B interface in order to ingest Correlative Data that are related to special products and are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.8-1.

Table 5.13.8-1. Description of Correlative Data via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	HDF-EOS format as selected by SCF (TBR)
Expected Volume	Variable
Expected Frequency	Variable

5.13.9 Documents via Network

ECS uses this Release B interface in order to ingest Documents that are related to special products and that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.9-1.

Table 5.13.9-1. Description of Documents via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	rtf, ps, pdf, or HTML
Expected Volume	Variable
Expected Frequency	Variable

5.13.10 Documents via Media

DAACs use this Release B interface in order to ingest Documents that are related to special products and are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.10-1.

Table 5.13.10-1. Description of Documents via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	rtf, ps, pdf, or HTML
Expected Volume	Variable
Expected Frequency	Variable

5.13.11 Science Data Production Software via Network

ECS uses this Release B interface in order to ingest Science Data Production Software that are related to special products and that reside on an SCF machine. The format and content of the data flows are defined in Table 5.13.11-1.

Table 5.13.11-1. Description of Science Data Production Software via Network

Data Flow Characteristic	Release B Description
Source	SCF
Destination	ECS
Interface Method	kftp
Contents	As jointly determined by SCF and DAAC
Format	ASCII, 32-bit binary, 64-bit binary
Expected Volume	Variable
Expected Frequency	Variable

5.13.12 Science Data Production Software via Media

DAACs use this Release B interface in order to ingest Science Data Production Software that are related to special products and are received from the SCF on hard media. Section 4.6 specifies the acceptable ingest media. The format and content of the products are defined in Table 5.13.12-1.

Table 5.13.12-1. Science Data Production Software via Media

Data Flow Characteristic	Release B Description
Source	SCF
Destination	DAAC
Interface Method	Media Ingest
Contents	As jointly determined by SCF and DAAC
Format	ASCII, 32-bit binary, 64-bit binary
Expected Volume	Variable
Expected Frequency	Variable

This page intentionally left blank.

Appendix A. Internal and External Interfaces Between ECS and SCFs

Table A-1 lists the data interfaces between ECS and the SCFs in Releases A and B. The "from" column indicates the source of the flow and the destination of the flow is implicit. This table has general columns at the left, Release A Columns in the middle, and Release B columns at the right. Cells containing "n/a" identify information that is not relevant to Release A because the requirement is allocated to releases beginning with Release B.

"Internal" interfaces are defined for use herein as interfaces for which the SCFs use ECS-provided software for their side of the interface. Despite physical separation between the systems, these interfaces are considered to be within ECS or internal from a design specification point of view. "External" interfaces are defined as interfaces between ECS and systems using SCF-supplied software, which may be in the Public Domain or provided by a computer vendor. The internal interfaces are documented in the following ECS documents: ECS Ingest GUI in the Release A SDPS Ingest Subsystem Design Specification for the ECS Project and the Release B SDPS Ingest Subsystem Design Specification, the Release A Client in the Release A SDPS Client Subsystem Design Specification for the ECS Project, and the Release B Client in the Release B SDPS Client Subsystem Design Specification for the ECS Project.

The ECS Ingest GUI is ECS-supplied software that provides SCFs with a means by which authorized staff can initiate ECS electronic ingest of SCF-developed science software or data.

The Release A Client is an integrated software package that combines the searching and ordering components of the Version 0 IMS GUI Client with the ECS Desktop and Advertising Service to provide the science user interface to the Release-A ECS. It consists of a GUI to be distributed to DAACs, SCFs, and other users. The Client provides the capability to search, browse, review, and request ECS data and services.

The Release B Client is the ECS-developed replacement for the Release A Client that will be provided to the SCFs as part of Release B. The Release B Client includes and extends the functionality of the Release A Client.

SCFs not hosting DCE in the Release A time frame can use all internal and external interfaces as defined in this ICD. In the Release B time frame, SCFs not hosting DCE can use the external interfaces as defined in the body of this ICD. Information is TBD about the availability of each internal interface to such SCFs. If some Release B Client interfaces or the ECS Ingest GUI needed DCE, then certain subscriptions, data requests, or ingest requests would be unavailable.

Table A-1. Internal and External Interfaces Between ECS and SCFs in Releases A and B (1 of 4)

From ('To' is implied)	Data Flow Name	Internal or External in Rel A	Rel A Implementation Type	Internal or External in Rel B	Rel B Implementation Type
	Delivery of SCF Toolkit, Local Data Access Service, and other ECS Software:				
SCF	ECS Software Package Subscription	n/a	n/a	Internal	Rel B Client
ECS	ECS Software Package Subscription Acknowledgment	n/a	n/a	External (TBR by Rel B CDR)	email/WWW (TBD by Rel B CDR)
ECS	ECS Software Package Announcement (subscription triggered by arrival of new s/w)	External	Manual email	External (TBR by Rel B CDR)	email/WWW (TBD by Rel B CDR)
ECS	ECS Software Package (Distributed via MSS s/w distribution service)	External	Private ftp (EDHS)	External	kftp
	Science Software I&T Requirements:				
SCF	Request for Integration and Test Requirements	n/a	n/a	Internal	Rel B Client
ECS	Data Availability Notice for Integration and Test Requirements	n/a	n/a	External	email
ECS	Integration and Test Requirements *	External	WWW (EDHS)	External	kftp
	Interactive Session Dialog:				
ECS/ DAAC or SCF	Interactive Session Dialog	External	email	Internal	Rel B Client (includes email within the Client)
ECS	Science Software Integration and Test Status	External	kftp (if specified in the Interactive Session Dialog)	External	kftp (if specified in the Interactive Session Dialog)
	Ingest of Science Data Production Software Packages:				
SCF	Data Production Software Delivery Package Ingest Request	Internal	ECS Ingest GUI	Internal	ECS Ingest GUI
SCF	Data Production Software Delivery Package via Network	External	kftp	External	kftp
SCF	Data Production Software Delivery Package via Media	External	Media Ingest	External	Media Ingest
	Remote SCF Access to Some DAAC Operator Interfaces				
SCF	Remote Access Session Dialog Interfaces	External	X11 Access to DAAC	External	X11 Access to DAAC
	Provide SCF with Operational Science Data Production Software Package:				

SCF	Request for Operational Science Data Production Software Package	ExternalInternal	WWWRel A Client	Internal	Rel B Client
ECS	Data Availability Notice for Operational Data Production Software Package	External	email	External	email
ECS	Operational Data Production Software Package	External	kftp	External	kftp

Table A-1. Internal and External Interfaces Between ECS and SCFs in Releases A and B (2 of 4)

From ('To' is implied)	Data Flow Name	Internal or External in Rel A	Rel A Implementation Type	Internal or External in Rel B	Rel B Implementation Type
	Provide SCF with Results of Software Tests and Receive Reviews from SCF:				
SCF	Request for Test Products	ExternalInternal	WWWRel A Client	Internal	Rel B Client
DAAC	Test Product Availability Message during Software Integration and Test	External	email	External	email
ECS	Data Availability Notice for Test Products after Software Integration and Test	External	email	External	email
ECS	Test Products	External	kftp	External	kftp
SCF	Test Product Reviews	External	email	Internal	Rel B Client
	Enable SCFs to make QA-related Subscriptions and Obtain Data for QA:				
SCF	QA Notification Specification (subscription request)	External	email	Internal	Rel B Client
ECS or DAAC	QA Notification Specification Acknowledgment (subscription acknowledgment)	External	email	Internal	Rel B Client
ECS	Data Quality Request Notification	External	email	Internal/ External	1) Rel B Client if client active 2) email otherwise
SCF	Request for Data to QA	Internal	Rel A Client	Internal	Rel B Client
ECS	Data Availability Notice for Data Delivered for QA	External	email	External	email
ECS	Data Delivered for QA.	External	kftp	External	kftp
SCF	QA Metadata Updates	External	WWW	External	WWW
	Enable SCF to update metadata based on the SCF's QA of SCF-Provided Science Data Products:				
SCF	On Time QA		Implemented as QA Metadata Updates		
SCF	Metadata Updates	Internal	Release A Client	Internal	Rel B Client

	Enable SCF to Request and Obtain Processing Status and Errors for SCF-Provided Science Data Products:				
SCF	Request for Processing Status	ExternalInternal	WWWRel A Client	Internal	Rel B Client
ECS	Data Availability Notice for Processing Status	External	email	External	email
ECS	Processing Status	External	WWWkftp	External	kftp

Table A-1. Internal and External Interfaces Between ECS and SCFs in Releases A and B (3 of 4)

From ('To' is implied)	Data Flow Name	Internal or External in Rel A	Rel A Implementation Type	Internal or External in Rel B	Rel B Implementation Type
	Enable SCF to Request and Obtain Resource Usage for SCF-Provided Science Data Products:				
SCF	Request for Resource Usage	ExternalInternal	WWWRel A Client	Internal	Rel B Client
~~ECS~~	~~Data Availability Notice for Resource Usage (Present DAN was defined for INS and DSS. If MSS uses different parameters, we will need a new name for the new notice.)~~	~~External~~	~~email~~	~~External~~	~~email~~
ECS	Resource Usage	External	WWWkftp	External	kftp
	Enable SCF to Request and Obtain Production History for SCF-Provided Science Data Products:				
SCF	Request for Product History	Internal	Rel A Client	Internal	Rel B Client
ECS	Data Availability Notice for Product History	External	email	External	email
ECS	Product History	External	kftp	External	kftp
	Enable SCFs to Request Reprocessing of SCF-Provided Science Data Products:				
ECS	Reprocessing Request Template (Implemented in Rel A via information in Contents row of Table 5.27-10 Template GUI via X11 Interface)	External	via Internet	~~TBD~~ External	~~TBD~~ via Internet
ECS	Reprocessing Request Template (Template GUI via X11 interface)	External	via modem	External	via modem
SCF	Reprocessing Request	External	email	~~TBD~~ External	~~TBD~~ email
ECS or DAAC	Reprocessing Request Acknowledgment	External	email	~~TBD~~ External	~~TBD~~ email
SCF	Reprocessing Request (via X11 interface)	External	X11 Access to DAAC via Internet	External	X11 Access to DAAC via Internet
SCF	Reprocessing Request (via X11 interface)	External	X11 Access to DAAC via modem	External	X11 Access to DAAC via modem

	Enable SCFs to Obtain and Update Coefficients and SCF-Generated Ancillary Data:				
SCF	Coefficients and SCF-Generated Ancillary Data Request	Internal	Rel A Client	Internal	Rel B Client
ECS	Data Availability Notice for Coefficients and SCF-Generated Ancillary Data	External	email	External	email
ECS	Coefficients and SCF-Generated Ancillary Data	External	kftp	External	kftp
SCF	Coefficients and SCF-Generated Ancillary Data Update Request	Internal	Ingest GUI	Internal	Ingest GUI
SCF	Coefficients and SCF-Generated Ancillary Data Update Package Network Ingest	External	kftp	External	kftp
SCF	Coefficients and SCF-Generated Ancillary Data Update Package Media Ingest	External	Media Ingest	External	Media Ingest

Table A-1. Internal and External Interfaces Between ECS and SCFs in Releases A and B (4 of 4)

From ('To' is implied)	Data Flow Name	Internal or External in Rel A	Rel A Implementation Type	Internal or External in Rel B	Rel B Implementation Type
	Ingest of Special Products				
SCF	Special Products Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Special Products via Network	n/a	n/a	External	kftp
SCF	Special Products via Media	n/a	n/a	External	Media Ingest
	Ingest of Ancillary Data (related to Special Products)				
SCF	Ancillary Data Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Ancillary Data via Network	n/a	n/a	External	kftp
SCF	Ancillary Data via Media	n/a	n/a	External	Media Ingest
	Ingest of Calibration Data (related to Special Products)				
SCF	Calibration Data Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Calibration Data via Network	n/a	n/a	External	kftp
SCF	Calibration Data via Media	n/a	n/a	External	Media Ingest
	Ingest of Correlative Data (related to Special Products)				
SCF	Correlative Data Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Correlative Data via Network	n/a	n/a	External	kftp
SCF	Correlative Data via Media	n/a	n/a	External	Media Ingest
	Ingest of Documents (related to Special Products)				
SCF	Documents Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Documents via Network	n/a	n/a	External	kftp
SCF	Documents via Media	n/a	n/a	External	Media Ingest
	Ingest of Data Production Software (related to Special Products)				
SCF	Data Production Software Ingest Request	n/a	n/a	Internal	ECS Ingest GUI
SCF	Data Production Software via Network	n/a	n/a	External	kftp
SCF	Data Production Software via Media	n/a	n/a	External	Media Ingest

*For particular SCF-DAAC pairs the procedures documents signed by those pairs of organizations will take precedence over the more generalized software developers' guidelines (DID 205, Part 4) cited herein.

This page intentionally left blank.

Appendix B. SCF ICD Issues Related to Release B

1. Prepare to add data flow mechanisms for Browse data and Guide information, for Special Products, if these ECS-SCF IRD requirements are approved by ESDIS CCB.
2. Add interface mechanisms for ECS Software and Reprocessing Requests to ICD.
3. Determine availability of Release B interfaces to SCFs not hosting DCE client software and factor into the ICD.
4. Define SCF interfaces for remote science software I&T at DAAC.
5. Respond to IV&V 1/3/96 and 1/16/96 comments by resolving the issues with e-mail attachments and e-mail error handling to the satisfaction of IV&V and ESDIS and making suggested editorial changes.
6. Revisit mechanism for QA metadata update from SCF to DAAC.

This page intentionally left blank.

Abbreviations and Acronyms

ASCII	American Standard Code for Information Interchange
CCB	Configuration Control Board
CDR	Critical Design Review
CDRL	Contract Data Requirement List
CSMS	Communications and Systems Management Segment
DAAC	Distributed Active Archive Center
DAN	Data Availability Notice
DCN	Document Change Notice
DCE	Distributed Computing Environment
DID	Data Item Description
ECS	EOSDIS Core System
EDHS	ECS Data Handling System
email	electronic mail
EOC	EOSDIS Operations Center
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data and Information System
ftp	file transfer protocol
GSFC	Goddard Space Flight Center
GUI	Graphical User Interface
HDF	Hierarchical Data Format
HDF-EOS	HDF (with) Earth Observing System extensions
HTML	Hyper Text Markup Language
http	hypertext transport protocol
ICD	Interface Control Document
IDR	Incremental Design Review
IP	Internet Protocol

IRD	Interface Requirement Document
ISO	International Standards Organization
IST	Instrument Support Toolkit
KB	kilobytes
kftp	Kerberized file transfer protocol
LAN	Local Area Network
MB	megabyte
NSI	NASA Science Internet
pdf	portable document format
PGE	product generation executive
ps	Postscript [format]
PVL	Parameter Value Language
RFC	Request for Comment
rtf	rich text format
SCF	Science Computing Facility
SDP	Science Data Processing
SDPS	Science Data Processing Segment
tar	UNIX command to archive files. Also, format of files archived by tar
TBD	To be determined
TBR	To be reviewed
TBS	To be supplied
WAN	Wide Area Network
WWW	World Wide Web
Z	UNIX compressed format